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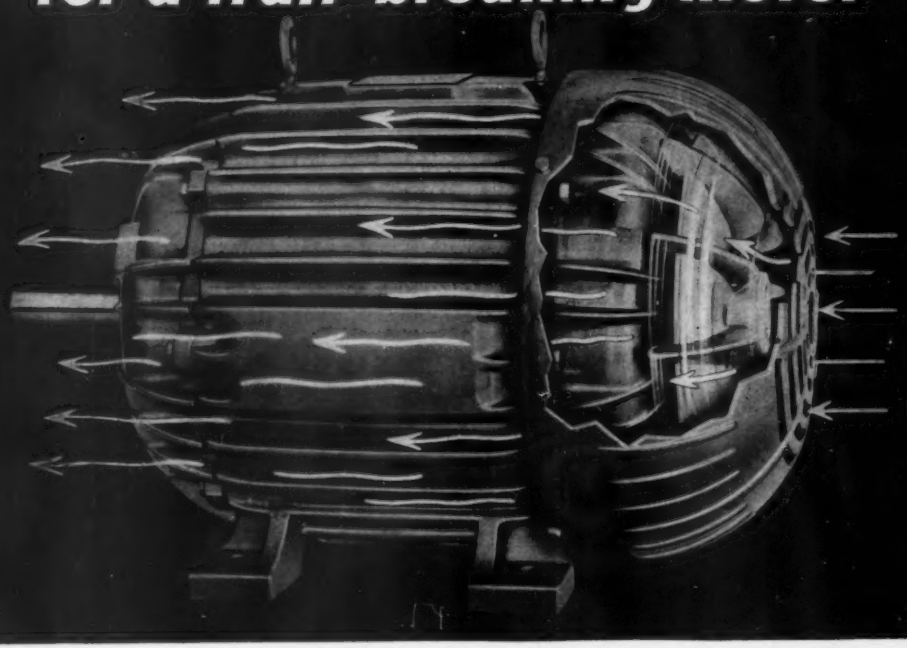
Volume 5, No. 10 Circulation of this issue 32,286

The magazine that helps plant engineers with their everyday problems

TENTH ANNIVERSARY
for a trail-breaking motor



THE ELLIOTT CROCKER-WHEELER *Sealedpower* MOTOR

SEALEDPOWER BRAKE MOTORS

The C-W Sealedpower motor is available equipped with the newly designed C-W Brake, providing increased brake capacity without increased bulk.

The Elliott C-W Sealedpower motor is available also in explosion-proof construction. Bulletin SL-300-5 covers this type. Copy on request.

Crocker-Wheeler motors range from 1 to 200 hp. Larger Elliott motors and generators are built by the Ridgway Division in Ridgway, Pa.

TEN YEARS AGO the C-W "Sealedpower" motor, with its unique cooling and self-cleaning system, made its bow to American industry. Its immediate and continued popularity has put thousands into successful service.

Completely enclosed, there's no way for dirt, dust, moisture or fumes to get in. But there's an easy out for heat—by way of the 150% increased radiating surface of the many radial fins, plus the fan-driven air blast directed along and around the fins and frame. It cleans itself, too—the air blast gives dirt and dust the quick brush-off.

WAY AHEAD OF ITS TIME ten years ago, the C-W Sealedpower Motor with further refinements is still ahead, and is the ideal motor for any service within its capacity range. Write today for Sealedpower Bulletin. Address your request to Elliott Co., Dept. PE, Jeannette, Pa.

ELLIOTT COMPANY—*Crocker-Wheeler Division, Ampere, N. J.*

BRANCH OFFICES AND REPRESENTATIVES IN PRINCIPAL CITIES. CW-27

ELLIOTT *Approved* SERVICE SHOPS COVER THE COUNTRY.

GENERAL OFFICES & MAIN PLANT—JEANNETTE, PA.

You're a step ahead with **ELLIOTT**

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

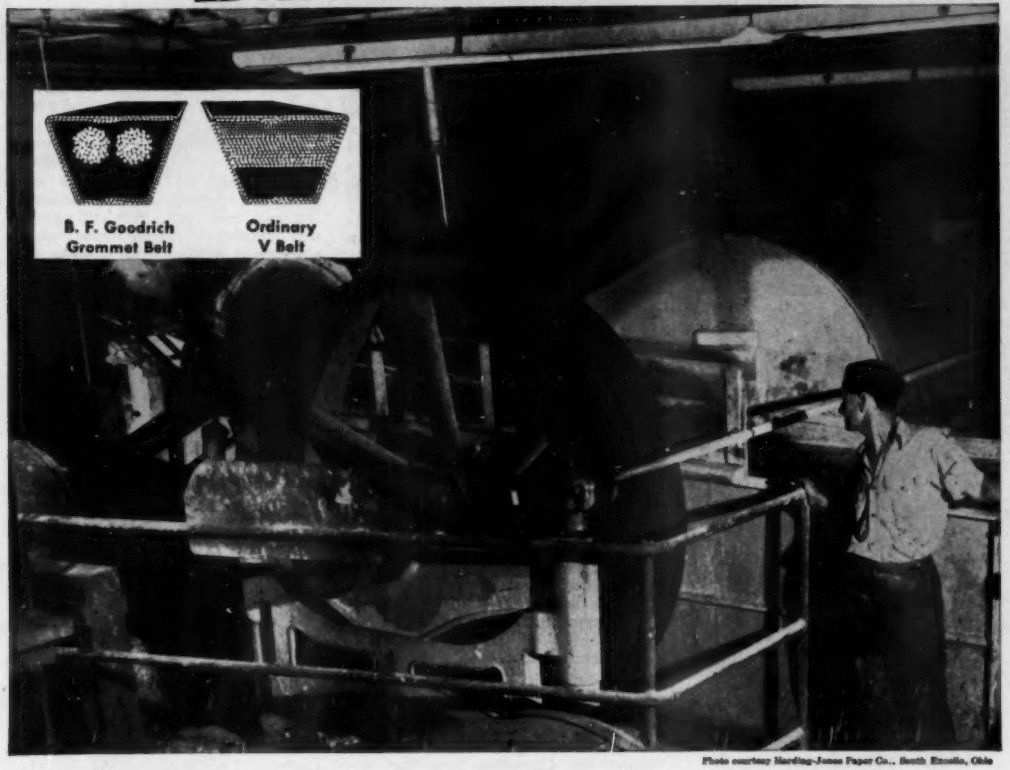


Photo courtesy Harding-Jones Paper Co., South Excello, Ohio

Drive headache cured with B. F. Goodrich grommet belts

B. F. Goodrich grommet V belts cut costs 20 to 50%

HERE was one of the biggest drive problems in this plant. The machine shown in the picture runs 24 hours a day, 7 days a week. Belts previously used couldn't handle the job. Motor bearings were burning out, belts were snapping under the shock load.

Then a B. F. Goodrich distributor suggested grommet belts to stand the jerks and hard pulls. Installed nine months ago, B. F. Goodrich grommet belts are still going strong, and look good for many more months of use. Here's why BFG grommet belts give longer service, save maintenance costs:

Endless — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping cord sections. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless grommet belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

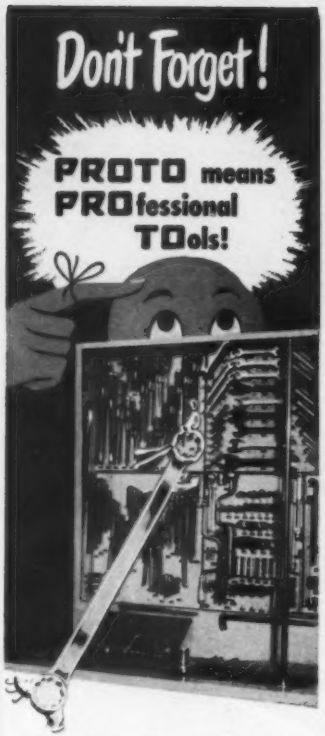
Better grip, less slip — Because a grommet is endless, a grommet belt is more flexible, grips the pulleys better. Size for size, grommet belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich makes the grommet!—No other multiple-V belt is a grommet belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B.F.Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B.F.Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet Belts BY

B.F.Goodrich

RUBBER FOR INDUSTRY



Like professional users, you can point with pride to your PROTO tools. And like our Wrenchund, you'll sit up and take notice when you see that each tool does your work faster, safer and better. Modern designs? You bet! Special steels? Toughest yet! How to buy? One or a set! See your PROTO dealer.

Send 10¢ for 68-page catalog to

PLOMB TOOL COMPANY

2274H Santa Fe Avenue
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TOOLAGRAM

PROTO adjustable wrenches are forged from fine alloy steel. The lower jaw design fully seats both square and hex nuts, preventing slippage. Sizes—4"—20"

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PROTO TOOLS
LOS ANGELES

'ROUND ABOUT with the editors in field and office

1950 Volume on Microfilm

MICROFILMS OF the 1950 volume of PLANT ENGINEERING are available for library and company records. The entire volume is on a single 35 mm roll and comes packed in a carton 3¾ by 3¾ by 1½ inches. The price is $3.50. These Microfilms are available from University Microfilms, 313 N. First Street, Ann Arbor, Michigan.

An Unfinished Manuscript

IT IS WITH deep regret that we announce the death of F. J. SMITH, a good friend, an ingenious plant engineer and a charter member of the Plant Engineer Society of San Francisco. As author of "Plant Fire Brigades—Notes on Organization Training," on Page 58 of the November 1950 issue, he was known to our readers and many benefited by his experience and advice.

He had just started another article forwarded to us by his widow: "I am sending on the few short lines that Smitty started for his next article. He seemed to want to work on that very much and during the last six months of his life mentioned many and many a time that he must get started on it. This little bit that he did seemed so important to him that he really drove himself to get it started. He did get to read the article in the April issue (page 140) about the Canadian firm that rearranged their plant program according to his Fire Brigade article. He was very happy over that."

Below are those first few lines without title just as Smitty wrote them. They are published as an epitaph to a great engineer with a deep interest in sharing his experience to help others.

"Lost time accidents in this plant must stop," said the president of an appliance manufacturing company. The bill for insurance premium lay alongside the production records and were the cause of this special meeting of management personnel. The insurance rates were up 20 per cent and production down 20 per cent.

The Director of Industrial Relations said, "We need a safety program and we need it now. Who is to handle the job of plant safety? Why not the Plant Engineer? He is most familiar with the entire plant and is best equipped to make any changes in equipment, through the Maintenance Department."

"OK, Mr. Plant Engineer," said the president. "In addition to your present duties, you will be safety engineer. Pick committees and draft a program at once."

Insurance companies are a good source of information on safety organization and a telephone call brought a representative to the plant the very next day. A plant survey was completed in three days. Unsafe equipment and operations were recorded and plans made for the committee organization, one workmen's committee and one general committee.

The Workmen's Committee consisted of 10 plant and officer personnel picked to represent, as near as possible, each Department. The General Committee was selected from plant management and included the plant manager, director of industrial relations, nurse or doctor, plant engineer, development engineer and a secretary. The latter was to serve on both committees, make notes on recommendations, keep records on action taken by general committee, and make monthly reports to insurance underwriters.

National Metal Exposition

THE NATIONAL METAL EXPOSITION and Congress will be held at the Michigan State Fair Grounds, Detroit, Michigan, from October 15th through 19th. Information will be exchanged on steel making and refining, preparation of metals for economic fabrication, fabrication of metals, and research in metals. Additional information may be obtained from the American Society for Metals, 7301 Euclid Avenue, Cleveland 3, Ohio.

Cooling Tower Institute

AT THE BEGINNING of this year seven companies adopted a constitution setting up the Cooling Tower Institute, to engage in and/or support research to improve the technology, design and performance of industrial water cooling equipment. Other objectives mentioned in the constitution include conservation of water as a natural resource, to establish standards and general specifications, and to work toward the development of standardized testing procedures.

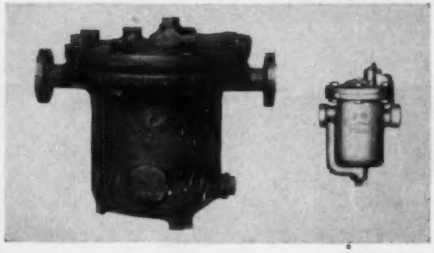
Membership in this organization is open to companies engaged in the

(Continued on page 160)

Plant Engineering is published monthly at Chicago, Ill. Subscriptions one year $10 in the U. S. A. Canada $11; Elsewhere $12. Acceptance under Section 34.64, P. L. & R. authorized by Post Office.

FOR BIG TRAP CAPACITY IN A SMALL PACKAGE ...buy Armstrongs

SIZE FOR SIZE THEY GIVE YOU MORE



FROM THE RIDICULOUS TO THE SUBLIME . . . **The monstrosity on the left is a steam trap once manufactured in Germany. It weighs 116 lbs. but has no more capacity than the 10½ lb. Armstrong trap on the right. All of which is a means of focussing your attention on the importance of a steam trap leverage system. The size of the big trap is necessary due to its crude-by-comparison leverage design.**

ARMSTRONG steam trap capacity is a bargain size for size because of the patented leverage system. In an Armstrong trap for 100 psig, leverage is higher than in one for, say, 15 psig. Thus, a larger valve can be opened than would be possible if the leverage was the same for all pressures.

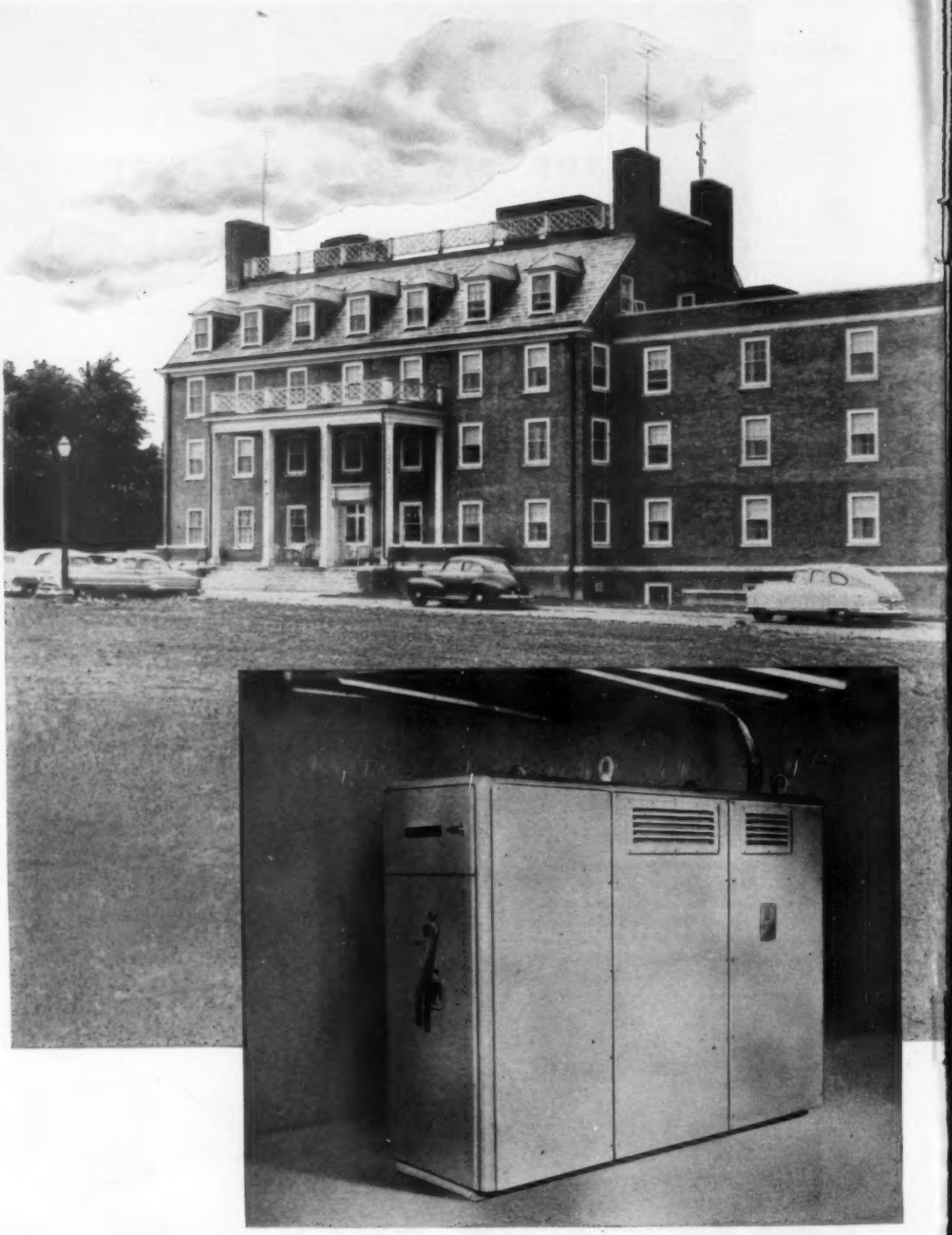
That sounds simple, but isn't. If higher leverage is secured with a longer lever arm, a bigger trap body is needed. That's the trouble with the elephant shown at the left. Also the design must permit the valve to open *wide* or it will restrict the orifice, reducing capacity. *Armstrong's design answers these problems better than any other design.*

P. S. When comparing traps be sure capacities are based (as are Armstrongs) on *actual* tests with condensate at steam temperature. No other basis is reliable. ARMSTRONG MACHINE WORKS, 912 Maple St., Three Rivers, Michigan.

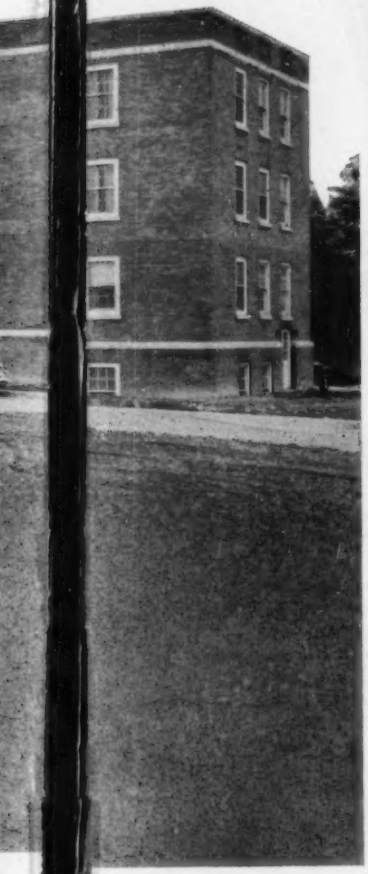
SEE OUR CATALOG IN SWEET'S

The 36-PAGE STEAM TRAP BOOK gives dimensions, weights and *actual* capacities of Armstrong traps. Write for a copy or Call your local Armstrong Representative.

ARMSTRONG STEAM TRAPS



SAFER... More Dependable Power for Commercial and Industrial Building



The Shenango Inn, Sharon, Pennsylvania

Photo at left illustrates the Westinghouse "ASL" Power Center installed in the basement.

For safe and efficient power distribution, Westinghouse "ASL" Dry-Type Power Centers are the answer for industrial and commercial building. The Shenango Inn, for example, installed this most modern electrical equipment.

Here's a power center that is specially designed for efficient control of feeder circuits to supply both power and lighting. Easily installed, it comes as one complete unit with only two connections to make. Simply set the unit in place and connect both high and low-voltage feeders. In addition, you get these proved advantages:

COMPLETELY ENCLOSED FOR SAFETY. Power center is enclosed by sheet steel panels with all live parts covered for maximum protection. No oil or hazardous liquids used . . . no special protective vaults required.

NATURAL DRAFT VENTILATION. No fans or blowers are necessary. Large air ducts are provided for natural draft circulation through housing and coils. Vertical air cylinder insulates low-voltage windings from high-voltage windings.

LIGHT WEIGHT . . . SMALL SIZE. Lighter, smaller Hipersil® cores are standard in all Westinghouse Power Centers. Because no heavy, bulky liquids are used, a heavy tank is not necessary. Approximately ⅓ less floor space required.

MINIMUM OF MAINTENANCE. No liquids to store, recondition or replace . . . no valves, gaskets or fluid-level gauges to maintain.

Available in ratings 2,000 kva to 300 kva; high voltage 15,000 volts to 5,000 volts as "ASL". 300 kva and below, 5,000 volts and below as "AVR".

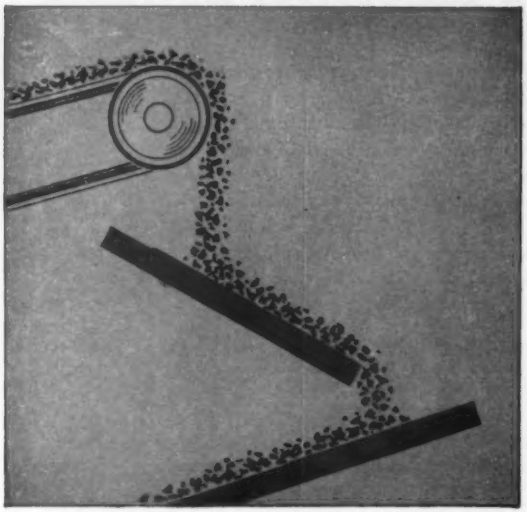
Call your nearest Westinghouse representative for complete information. Or write for Booklet B-4428, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pennsylvania.

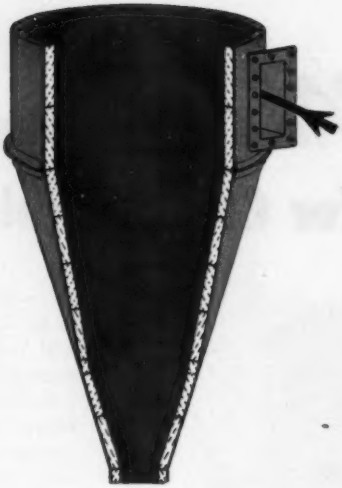
J-70613

Westinghouse

POWER CENTERS

abrasion?





erosion?

Here are even tougher

The weak link in keeping certain equipment on the production line often lies in rapid abrasion and erosion of vulnerable areas. For example:

In Cyclone Dust Collectors where there's a ceaseless blast of highly abrasive particles.

In Coke Chutes and Hoppers which must withstand constant cascades of fiery coke or cold coke.

In Hot Blast Mains through which dust-laden gases travel at high velocities.

In Billet Heating Furnaces through which hundreds of massive metal slabs are pushed.

Under conditions like these, metals, paving bricks and other normally durable materials are simply worn away — and in very short order. It takes exceptionally tough linings or bearing surfaces — as provided by our MONOFRAX K fused cast blocks or our CARBOFRAX silicon carbide bricks and shapes — to stand the gaff.

Both these Super Refractory materials by CARBORUNDUM *are within one index point of diamond hardness!* It is this hardness that gives these Super Refractories their exceptional resistance to abrasion—from room temperature to high heats.

Granted, abrasion is seldom an isolated condition. It's usually abrasion *plus* . . . heat, or acid attack, or some other condition. But, as you can see (top, opposite page), these Super Refractories have many other properties, equally as desirable as abrasion resistance and equally important in certain applications.

Information is now available on all the various groups of Super Refractories by CARBORUNDUM. Just send the coupon and you'll receive our new booklet. No obligation, of course.

THE CARBORUNDUM COMPANY

Refractories Division • **Perth Amboy, New Jersey**

"Carborundum," "Carbofrax," "Monofrax" and "Alfrax" are registered trademarks which indicate manufacture by The Carborundum Company.

SUPER REFRACTORIES ARE ALSO USED

WHERE HEAT CONDUCTIVITY IS NEEDED. At elevated temperatures CARBOFRAX refractories conduct heat as rapidly as chrome-nickel steels! This characteristic is invaluable in checkers, muffles, hearths, etc.

WHERE CHEMICAL ACTION IS PRESENT. In general, all Super Refractories are either neutral or acid in nature — are widely used where chemical inertness is important.

WHERE STRENGTH IS IMPORTANT. No commercial tonnage refractories have greater strength than Super Refractories. All can withstand over 300 psi at 2750° F without crushing.

WHERE HIGH HEAT IS INVOLVED. They can be safely used at temperatures over 3000° F. They are very durable — are highly resistant to spalling and cracking. Some varieties are almost indispensable where flame impingement or violent temperature changes are present.

WHERE INSULATION IS NEEDED. One of these products, ALFRAX BI aluminum oxide material, consists structurally of many hollow spheres. It's one of the best insulating materials at very high temperatures.

WHERE SPECIAL SHAPES ARE INDICATED. Practically all Super Refractories are available either as bricks or special shapes molded to close tolerances — including fitted joints, tubes, etc.

Do any of these suggest possible applications?

materials of construction than grinding wheels

The important thing about Super Refractories by CARBORUNDUM is NOT just that they are "better" than standard fireclay refractories. The important thing is that they are actually *a class apart* — with many entirely different properties and applications. (For example, some of their properties — such as abrasion resistance — are important *regardless of whether high temperatures are involved.)*

Nor is their principal value simply that they cure trouble-spots where other materials (e.g., refractories, metals, etc.) fail to stand up. Their value usually lies in increasing capacity and reducing overall operating costs. (For example, regenerator checkers made of CARBOFRAX brick absorb and release over 3 times as much heat as checkers made of ordinary refractories when cycles are short.)

WHY NOT CHECK UP? We have a new booklet which outlines the unusual characterictics of these special purpose materials. The coupon will bring you the story — or one of our engineers would be happy to talk over your specific problems. We believe it could be mutually profitable.

This advertisement — one of a series — is presented in the belief that in the unusual properties of the various Super Refractories by CARBORUNDUM lies the key to many new or improved processes. We would like to talk over specific jobs with anyone who sees such possibilities.

Dept. Z-101
Refractories Div., The Carborundum Co.
Perth Amboy, New Jersey

Please send your free booklet on properties of Super Refractories

Name_____

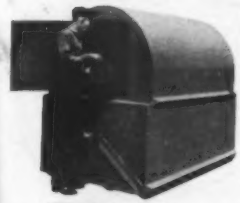
Position_____

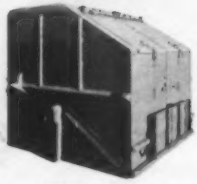
Company_____

Street_____

City_____ **Zone**_____ **State**_____

How The Dempster-Dumpster System Cuts Cost of Equipment . . . Eliminates Re-Handling of Materials!



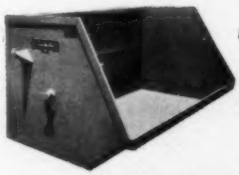


One Truck-Mounted Dempster-Dumpster Picks Up, Hauls and Dumps Scores of Pre-Loaded Containers, One After Another, Regardless of Size or Design for Handling Liquid, Solid, Trash, Dust, Light, Heavy or Bulky Materials.

You can eliminate large investments in trucks, reduce the cost of gas, oil and maintenance . . . avoid time lost by loading crews while trucks make haul . . . and eliminate re-handling of materials by installing the Dempster-Dumpster System!

In the first place, three to five conventional dump trucks with crews cannot possibly do as efficient and economical a job as one truck-mounted Dempster-Dumpster with only one man, the driver. Dempster-Dumpster Containers are spotted at convenient accumulation points inside and outside your plant. The driver and his Dempster-Dumpster are constantly on the move servicing one loaded container after another. The Model LFW Dempster-Dumpster illustrated above handles containers up to 12 cu. yd. capacity. Containers up to 21 cu. yds. are available for use with our Type ARLF and Type DTLF Dempster-Dumpsters. Your Dempster-Dumpster and driver may be handling liquids on one haul, solids on another, waste materials on another, etc. The Dempster-Dumpster driver can pick up a load, put it in carrying position and dump it in 2¼ minutes!

Without question, the Dempster-Dumpster System is the most economical and most efficient method of plant materials handling by truck yet devised! Write today for complete information. Manufactured exclusively by Dempster Brothers, Inc.



DEMPSTER BROTHERS - 1101 Shea Building - Knoxville 17, Tennessee

WHEN POWELL VALVES GO IN, MAINTENANCE GOES OUT!

With today's urgent need for maximum production, why take a chance on any valves that require constant attention?

By installing Powell Valves—built for perfect performance with minimum maintenance—you can stop worrying about your flow control equipment.

Gate, Check, Globe and Y Valves, in Bronze, Iron, Steel and Corrosion-Resisting Metals and Alloys

Fig. 375. Small 200-pound Bronze Gate Valve with renewable, wear-resisting "Powellium" nickel-bronze disc.

★ *Quality fine throughout "The Line"* ★

POWELL

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

WHEN YOU'RE ALREADY RUNNING

FULL BLAST!

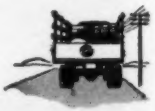
let Barrett SPEED your Roofing Jobs!

On top of all your other responsibilities, why worry about roofs . . . not only the condition of your present roofs, but also the quality of materials and workmanship and the time it will take to build any new roof you may need?

And you won't have to, if you rely on Barrett! Barrett can give you the world's longest-lasting built-up roof in the shortest possible time. For Barrett *speeds* your roofing jobs in 4 important ways.

1 **BARRETT SPEEDS** specifications. Ready at hand are Barrett time-tested, scientifically calculated application specifications for almost every built-up roofing problem. These are so foolproof that Barrett Specification* Roofs can be bonded for 20 years, and generally last much longer. Approved by the National Board of Fire Underwriters—Class A.

2 **BARRETT SPEEDS** deliveries. Strategically located supply points enable us to rush materials to your Barrett roofing contractor, and to your job when they are needed.



3 **BARRETT SPEEDS** application. Barrett does not have to rely on outside sources of supply for roofing pitch and felt. Because Barrett Specification* pitch and felt are made in our own factories, production can be controlled to meet demands. Your Barrett roofer can be sure that he will get the materials he wants when he needs them. No time lost on the job! Moreover, he can be sure that these materials will be of uniform high quality.

4 **BARRETT SPEEDS** you the finest possible roof. Skilled workmen make for fast jobs. Barrett Approved Roofers have had many years of practical experience, plus well-trained manpower, plus Barrett engineering help, to assure you the finest possible roofing job in the shortest possible time.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

205 W. Wacker Drive, Chicago 6, Ill.
1327 Erie Street, Birmingham 8, Alabama
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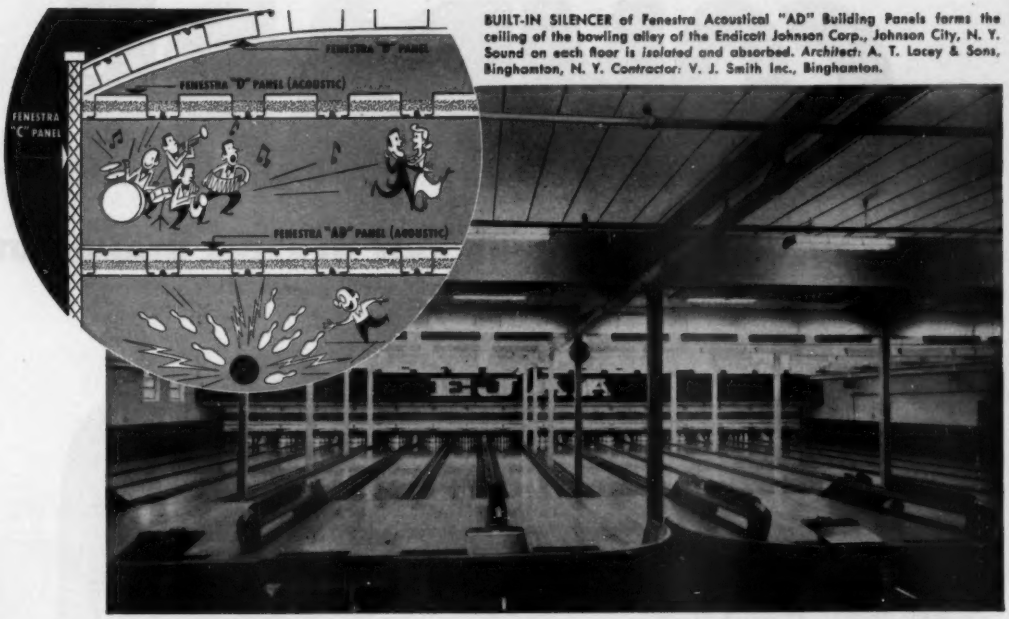
Barrett Specification Roofs*



BUILT-IN SILENCER of Fenestra Acoustical "AD" Building Panels forms the ceiling of the bowling alley of the Endicott Johnson Corp., Johnson City, N. Y. Sound on each floor is *isolated* and absorbed. *Architect:* A. T. Lacey & Sons, Binghamton, N. Y. *Contractor:* V. J. Smith Inc., Binghamton.

LOOK! an acoustical ceiling, a floor or roof ... *all in one money-saving package!*

Now you can save time, labor, materials, *money* and get a better job to boot. Fenestra* Acoustical "AD" Panels form a *built-in* silencer with a sound reduction coefficient of 0.80! Racket is isolated in each room, and absorbed. There's your answer to a noise problem that smashes worker-efficiency to the thundering tune of a reported $4,000,000 per day.

These long-span panels are *structural.* They form a finished ceiling and subfloor, or roof. Speedily and easily erected, these long-span panels are going into every *kind* of building. You can paint them without hurting their acoustical efficiency a bit. They're noncombustible.

DETAILS ON THE FENESTRA "AD" PANEL PACKAGE:

Size: Up to 24' long, 16" wide, 3", 4½", 6" and 7½" deep. 18 to 13-gage USS steel.

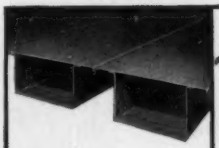
Elements: Cellular panel with ⅛" holes, 946 per square foot, in bottom surface. Wire-chair insulation support. 1" thick, 4¼-lb. density glass fibre sound insulation, coated on one side.

Send coupon for details. Or call the Fenestra Representative (listed under "Fenestra Building Products Company" in your Yellow Phone Book).

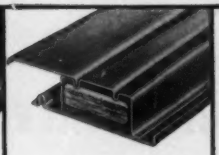
*Trademark

Fenestra PANELS • DOORS • WINDOWS

engineered to cut the waste out of building



"D" Panels for floors, roofs, ceilings. Standard width 16". Depth 1½" to 7½".



Acoustical "AD" Panels for ceiling-silencer-roof. Width 16". Depth up to 7½".

"C" Insulated Wall Panels. Standard width 16". The depth is 3".

DETROIT STEEL PRODUCTS COMPANY
Building Panels Division
Dept. PE-10, 2280 E. Grand Boulevard
Detroit 11, Michigan

Please send me, without obligation, information on Fenestra Building Panels.

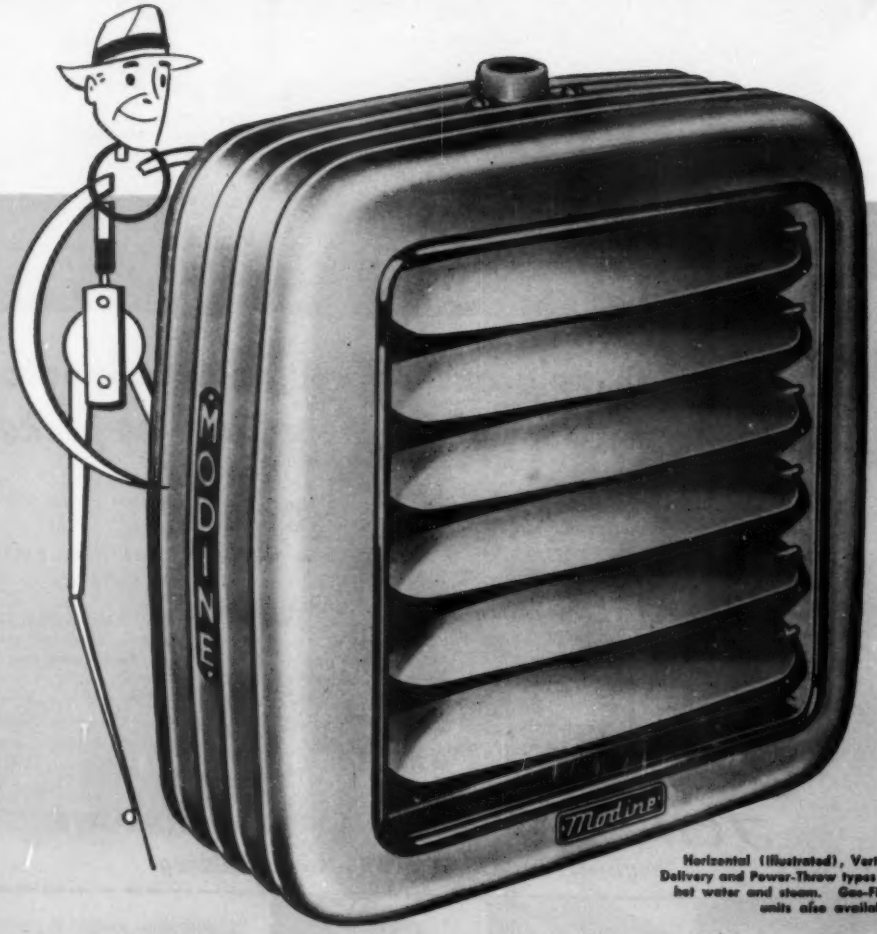
Name_____

Company_____

Address_____

COMPARE

. . . ON EVERY COUNT MODINE UNIT HEATERS STAND OUT



Horizontal (Illustrated), Vertical Delivery and Power-Throw types for hot water and steam. Gas-Fired units also available.

Modine UNIT HEATERS

U-1129

Advanced engineering . . . superb styling . . . highest grade materials and craftsmanship—all quality hallmarks of Modine Unit Heaters. They're your assurance of *heating performance at its best* — high fuel economy . . . years of trouble-free service. Built to a standard of excellence — Modine is the choice for unfailing dependability, lower operating and maintenance costs. So whether you need Horizontal Delivery models (illustrated), Verticals or Power-Throws — *compare first!* Modine Mfg. Co., 1563 DeKoven Ave., Racine, Wis.

ENGINEERS RATE MODINE THE STANDARD OF EXCELLENCE

Write for Bulletin 149-A, "Modine Unit Heating." Or contact your Modine representative listed in your phone book classified section.

Six of many outstanding features that account for the Modine quality reputation

Discharge air temperatures of 110° to 120° F. are correctly related to air velocities — assure perfect heating comfort plus lower fuel costs.

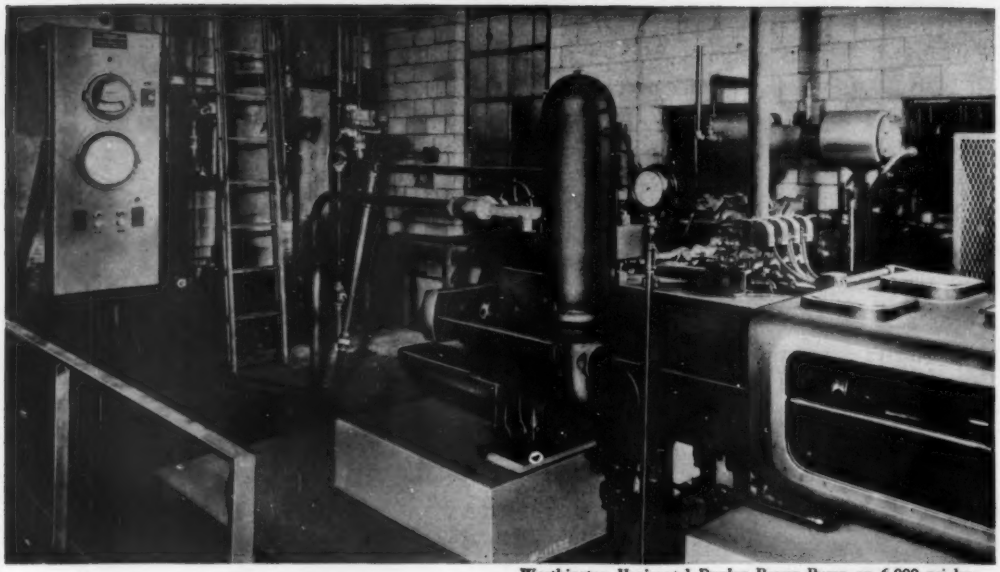
Sturdy, steel, integral fan guard offers safety from exposed fan — serves as a resilient, vibration-absorbing mounting for the unit's motor.

Built-in velocity generator effectively steps up heat throw. This assures positive heat penetration of the cold air strata that is near the floor.

Direct-from-pipe suspension is safe and economical, with no hanger-rods. Heated air stream may be easily redirected over full 360° range.

Sound-silencing features assure quieter operation — certified by accurate laboratory sound ratings. Especially important for commercial and institutional use.

Parker-Bonderizing provides rust-resistance for casings and other sheetmetal parts — anchors paint to steel — preserves the fine finish longer.



Worthington Horizontal Duplex Power Pump on 6,000 psi hydraulic system operating forging presses at Erie Forge Co., Erie, Pa.

Team up your Hydraulic Equipment

WITH THE ONE RIGHT PUMP FOR THE JOB

SAVE POWER, SPACE, LABOR

The pump in this picture is the "heart" of a centrally-controlled hydraulic system—powering a number of machines.

With such a system, this plant benefits from: increased overall operating efficiency and economy • concentration of hydraulic operations in a few pieces of equipment • convenient and simplified operation • use of water rather than inflammable or toxic liquid.

Complete Line—of Pumps, of Auxiliaries

The pump is a Worthington. It happens to be a horizontal duplex power pump. On another job, it might have been a high-speed vertical. Or, for larger capacity: a centrifugal pump. Or a steam pump. Or rotary. Whatever kind of pump the job calls for, Worthington *has* the right pump.

That's *one* big advantage in doing business with Worthington—the broadest range of pumps assures you the right one for each job.

Another advantage: Worthington can help you with *other* phases of the installation—for example: selection of proper design and size of high-pressure accumulaters and auxiliaries, system controls such as the Worthington suction valve unloader.

If you are planning a new or enlarged hydraulic system, Worthington's unequalled experience in hydraulics plus the wide range of Worthington equipment will help you *beforehand* to plan all these important factors in the installation.

For Descaling, Too

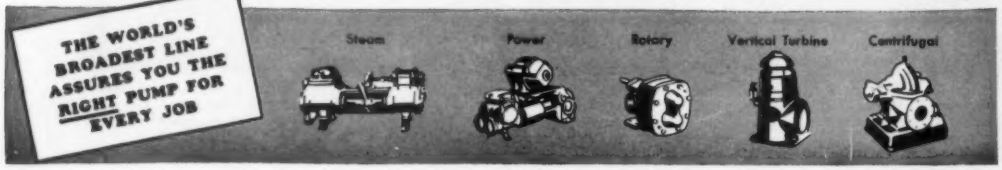
Ask us about the use of Worthington pumps on descaling of billets, sheets, plates, small parts. Descaling saves waste, saves wear on tools, reduces damage to dies in forging, improves the quality of the product.

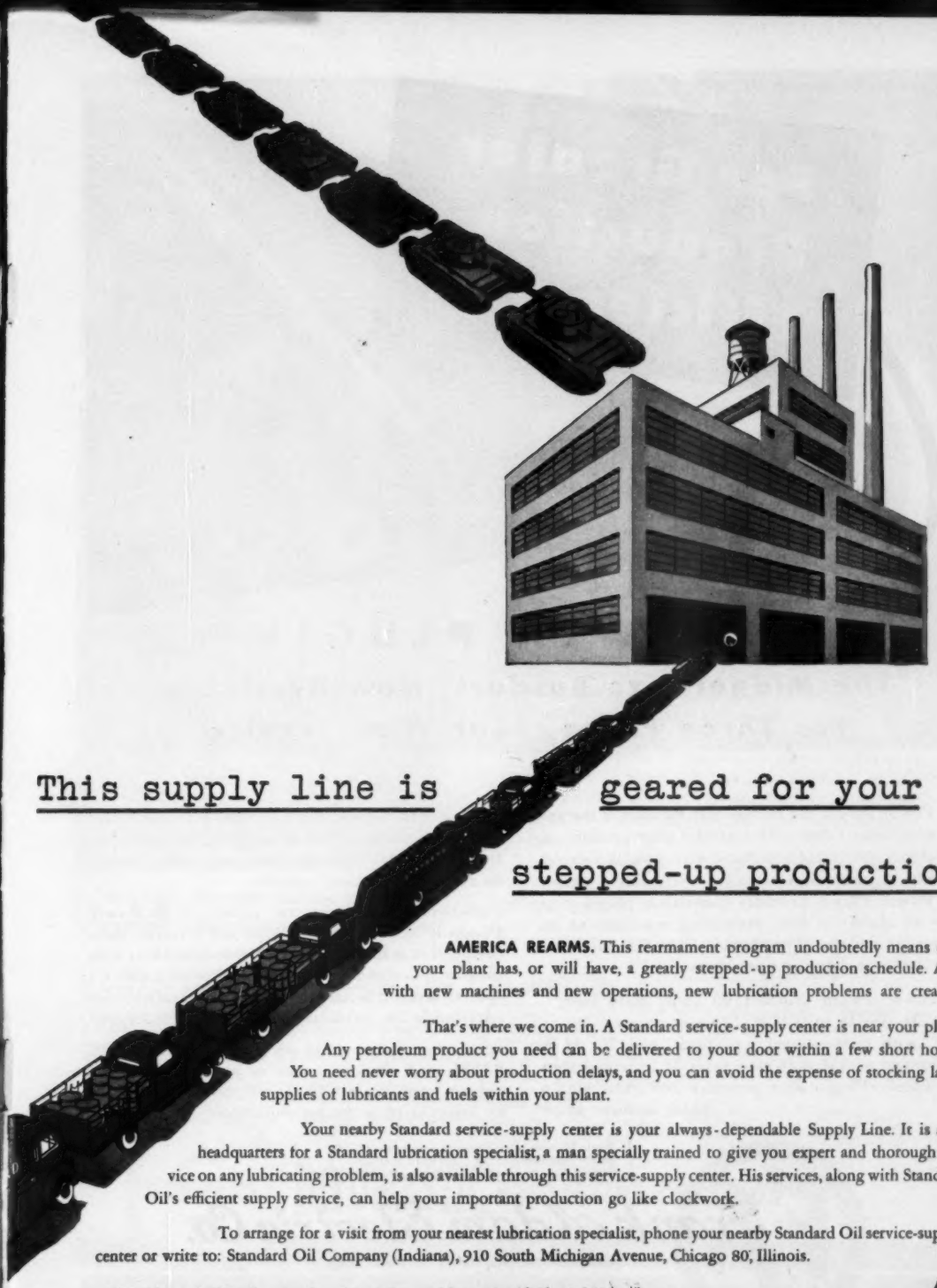
For further information proving *there's more worth in Worthington* write to Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, N. J.

WORTHINGTON

P.1.2

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB





This supply line is geared for your stepped-up production

AMERICA REARMS. This rearmament program undoubtedly means that your plant has, or will have, a greatly stepped-up production schedule. And with new machines and new operations, new lubrication problems are created.

That's where we come in. A Standard service-supply center is near your plant. Any petroleum product you need can be delivered to your door within a few short hours. You need never worry about production delays, and you can avoid the expense of stocking large supplies of lubricants and fuels within your plant.

Your nearby Standard service-supply center is your always-dependable Supply Line. It is also headquarters for a Standard lubrication specialist, a man specially trained to give you expert and thorough advice on any lubricating problem, is also available through this service-supply center. His services, along with Standard Oil's efficient supply service, can help your important production go like clockwork.

To arrange for a visit from your nearest lubrication specialist, phone your nearby Standard Oil service-supply center or write to: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

FA POWER PLUGIN

The Midget Size Busduct, Now Available For Three Phase, Four Wire Service

FA Power Plugin, the midget size Busduct is the answer to today's demand for greater plant production efficiency. Available now for 4 wire 3 phase service, 3 wire 3 phase service and 2 wire, single phase, FA Power Plugin provides convenient plugin outlets all along the line, permitting machines to be moved in and out of production lines without slowing down or delaying operations.

FA Power Plugin provides 60 amp., main feeder capacity for ½ to 3 H.P. 240 volt motors, AC or DC, with conventional type fuses, and 7½ H.P. maximum with dual element fuses. In its new design FA Power Plugin also provides 208 volts single phase or three phase for power to motors, and 120 volts for light where individual illumination on machines is desirable. It also provides 120 volts for small pump motors on return lubrication systems.

Underwriters' Laboratories approved, FA Power Plugin is only 3½ inches wide and 2 inches deep in size. It is available in 5- and 10-foot sections with plug-in outlets every 20 inches; additional outlets on special order. Special lengths are also available for application on production benches and machines.

For further information on this new, convenient, flexible and efficient system of power distribution contact your nearest FA representative (he's listed in Sweet's) or write for Bulletin.

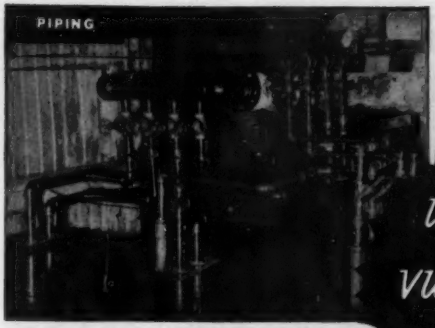
[Plugin FA Busduct is available to meet the need for greater capacities—225 to 1,000 amps, 600 volts. Bulletin No. 701 contains complete information.]

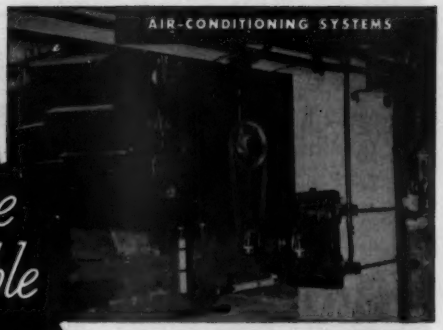
FA TRADE MARK

Frank Adam Electric Co.

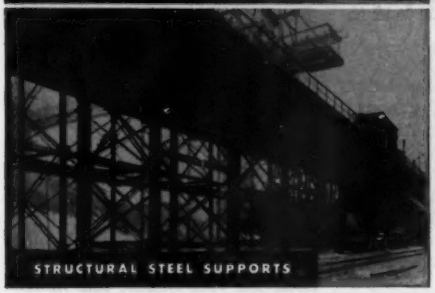
BOX 357 • ST. LOUIS 3, MISSOURI

Makers of BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER





in these vulnerable places



you can prevent corrosion with BITUMASTIC® PROTECTIVE COATINGS

UNLESS CHECKED, corrosion takes a terrific toll in and around industrial plants. And, in most instances, conventional paints just can't stand the gaff.

That is why Koppers makes industrial protective coatings that are *specially formulated* to combat corrosion. A whole family of them, too, so that there's a *specific* Koppers Coating to control *specific* kinds of corrosion—no matter how severe or unusual the corrosive elements may be.

Send for a set of our free booklets. They describe, in detail, the many advantages of using specialized protective coatings.

Here's why Bitumastic Coatings give lasting protection against corrosion and deterioration of metal, masonry and concrete:

- **Koppers Coatings, unlike maintenance paints, are specially formulated from a tar-pitch base* that is, for all practical purposes, impervious to water.**
- **Koppers Coatings provide a tough, impenetrable barrier to corrosive elements.**
- **Koppers Coatings provide up to 8 times the film thickness of conventional paint coatings.**
- **Koppers Coatings stop corrosion caused by moisture . . . acid fumes . . . alkaline fumes . . . corrosive soil . . . salt air . . . heat.**

**Hi-Heat Gray contains heat-resistant metallic base.*

Koppers Company, Inc.
Tar Products Division, Dept. 1023-T
Pittsburgh 19, Pa.

Please send me without charge or obligation your booklets on corrosion prevention.

Name.....

Address.....

City.....State.....

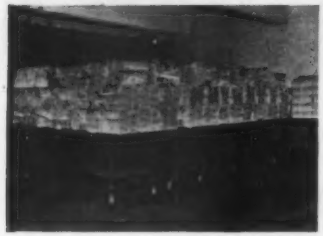
KOPPERS **BITUMASTIC** PROTECTIVE COATINGS
REG. U.S. PAT. OFF.

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

KOPPERS COMPANY, INC., Tar Products Division, Dept. 1023-T, Pittsburgh 19, Pa.

Caster Quiz

A "quick facts" feature with helpful suggestions on the use of casters . . . to reduce materials-handling costs, the "Reducible 30%."*



Q Are standard casters made that are easy to mount on equipment with pipe legs?

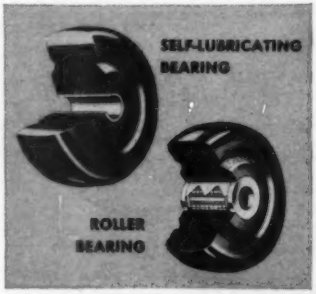
A Yes. The Bassick Co. manufactures casters with threaded pipe sockets, with wheels ranging from 3 in. to 8 in. diam. There are sizes to fit pipes of ¾ in., 1 in., 1¼ in. and 1½ in. diam. For lighter equipment, Bassick Casters are available in types to fit inside many sizes of pipe legs and steel tubing.

Q Are casters available that can readily be fastened to equipment with angle-iron legs?

A Yes. There are standard Bassick Casters with octagon stems to bolt or rivet to the inside of angles. Wheels range from 2½ in. to 8 in. diam. The Bassick Co. also makes a variety of angle brackets, for easy application of stem casters with wheels from 1½ in. to 5 in. diam.

Q Can swivel casters be held in fixed position?

A Yes. Many types, especially Bassick Heavy-Duty Casters, with 5 in., 6 in., 8 in. and 10 in. wheels, can be supplied with swivel locks. These easy-to-operate locks hold the swivel rigid until released, are a big aid in steering trailers or dollies that must be equipped with all swivel casters for easy maneuverability in confined areas.



Q Are roller or ball-bearing wheels essential in casters?

A No. They usually provide easier starting and rolling, but do not increase the caster's load capacity. There are many operating conditions where plain bearing metal wheels or self-lubricating bearing composition wheels are perfectly satisfactory, more economical. *Most important today* (because of critical shortages of roller bearings), casters so equipped can be delivered far more promptly.

Q Where can Bassick Casters be bought?

A At selected local industrial distributors, stocked to serve you. Look for your nearest one in the classified phone directory, or write Bassick for this information.

THE BASSICK COMPANY, Bridgeport 2, Conn. Division of Stewart-Warner Corp. *In Canada:* Bassick Division, Stewart-Warner-Alemite Corp., Ltd., Belleville, Ont.

***** *According to cost analysts, materials-handling (about 30% of total cost) affords about the only real opportunities for cost reduction today.*

SEE OUR CATALOG IN SWEET'S

Bassick

MAKING MORE KINDS OF CASTERS . . . MAKING CASTERS DO MORE

Fast Operation . Constant Service

with the NEW

AMERICAN MONORAIL CRANES

Double Bridge Crane shown above is 118 feet long—operates at 500 feet per minute under constant service requirements.

Here is the solution to the handling problem requiring frequent movement of heavy loads over maximum areas.

This new American MonoRail Crane is ruggedly built to handle loads up to 10 tons at operating speeds of 500 feet per minute. Articulated trolleys assure perfect alignment of trucks for smooth crane travel.

With this crane you get fast, constant service not only on the craneways but also through adjacent areas by way of interlocking MonoRail systems.

Let an American MonoRail engineer consult with you on the possibilities of constant, high-speed crane service.

SEND FOR BULLETIN

SEND FOR BULLETIN C-1. A 56 page book showing successful applications of American MonoRail Systems.

THE AMERICAN MONORAIL COMPANY

13123 ATHENS AVENUE — CLEVELAND 7, OHIO

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Curved Siphon Drains Drum

An extra pint of paint is obtained from each 50 gal drum by using a curved siphon suggested by R. Gorman. (From GM Folks, a publication of General Motors Corp., Detroit, Mich.)

New Jobs for Clay

THROUGH RESEARCH, the age-old brick industry looks forward to increasing acceptance of its products because of improvements in cavity-wall construction, panel walls, and development of clay-tile flooring beams.

The Structural Clay Products Institute has employed consulting research counsel to determine which types of applied research and development would best rejuvenate the industry and to recommend a program. After a survey the clay manufacturers set up the Structural Clay Products Research Foundation.

As part of the initial research program, a special type of pelletized glass wool insulation was found to be ideal for use in the cavity wall. It is cheap, non-settling, and permits free flow of moisture through the cavity to the weep holes provided to allow condensate to escape. Heat-flow tests revealed that this insulated cavity wall had reduced the heat transmission to one half of the uninsulated wall, sufficient to meet the most stringent requirements.

Another development is a method of panelized wall construction, which permits a four-inch wall to perform the functions of one twice as thick. At the brick plant a panel of mortared bricks is made up and reinforcing tie rods are run through the panel to give it sufficient strength against wind and other side stresses. By marketing the wall itself instead of the bricks comprising it, the wall can be put in place with the cost savings associated with other types of prefabricated panels. With the steel rod reinforcement, such thin walls have shown unusual structural strength. Although some development remains to be done before this type of panel is placed on the market, it appears to have a definite place in future construction.

The research program has also indicated possibilities for a pre-stressed mortarless clay tile flooring beam. Pre-stressed rods or steel wires running through the hollow tile beam give it high strength against loads perpendicular to it. A series of beams side by side would provide a finished floor surface and a ceiling, as well as readily available channels for electric conduits. Load-carrying capacities of more than 100 psf in long beams are readily obtainable, and the beams weigh less than 25 psf. Variations of this technique could conceivably be applied to roof beams and wall panels. *From Industrial Bulletin, a publication of Arthur D. Little, Inc., Cambridge, Massachusetts.*

Infrared Lamps Aid in Setting of Concrete in Winter

Infrared lamp method of heating concrete to assure proper setting has been employed during two winters in building cut-off wall at Mt. Morris dam. Lamps are mounted in wooden troughs (left). During severe weather conditions, an additional set of lamps is placed on top of form and tarpaulin coverings are used. (From Light, Feb. 1951, a publication of General Electric Co., Cleveland 12, Ohio)

Safety Matches Strike It Right

THE BOOK TYPE of safety match, along with a safety slogan which will be changed monthly, is being used by Humble Oil and Refining

Safety slogans on book matches tell employees to use safety matches on job

Co. to inform employees that safety matches should be used throughout the plant instead of outlaw or strike-anywhere matches.

Each month a new supply of matches will be placed in convenient containers at all plant entrances, and smoking rooms, as well as in the offices. The safety slogan will highlight the plant safety theme of the month.

Containers at plant entrances are designed to provide space for employees to discard any strike-anywhere matches that they might have in their pockets. *From The Humble Bee, a publication of Humble Oil and Refining Co., Houston, Texas.*

Hand-Operated Joggle Machine

HYDRAULICALLY-powered joggle machines are not new, but when Convair began stepping up its B-36 sub-contracting program, they found that none of the subcontractors had any type of joggle machine.

The tool planning and design team

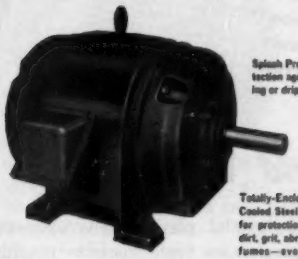
Wagner
ELECTRIC MOTORS
...the choice of leaders in industry

wherever motor hazards prevail...

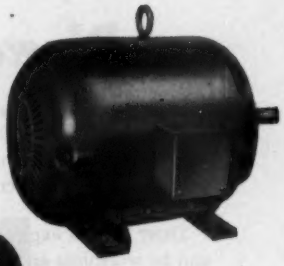
GUARD PRODUCTION WITH Wagner Protected Motors

Do you use motors in locations where dirt, filings, moisture, splashing liquids, explosive gases, acid fumes, or other motor hazards prevail? If you do —no matter how severe the operating condition—Wagner can furnish the *right* motor for your purpose, adequately protected for specialized requirements.

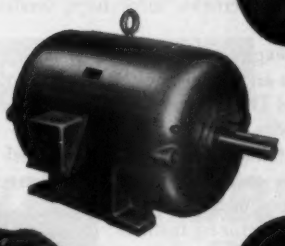
Wagner protected type motors are known for completely dependable operation in their specific applications. They are backed by sixty years of motor building experience. Five protected-type Wagner Motors are shown below. Bulletin MU-185 gives full information . . . write for your copy.



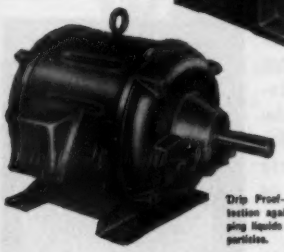
Splash Proof—for protection against splashing or dripping liquids.



Totally-Enclosed Fan-Cooled Steel Frame—for protection against dirt, grit, abrasives, or fumes—even in abnormal quantities.



Totally-Enclosed Fan-Cooled Cast Iron Frame—for protection against corrosion from fumes or moisture.



Drip Proof—for protection against dripping liquids or falling particles.

Explosion Proof—for complete protection in hazardous atmospheres.

WAGNER ELECTRIC CORPORATION
6492 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

Wagner Electric Corporation 1891 1951

MU1-10

How costly is YOUR D* FACTOR?

D* *means* DUST!

—and DUST in a modern industrial plant means operating losses. Uncontrolled DUST accelerates high-precision machine wear, contaminates products, multiplies maintenance and cleaning costs, and creates unhealthy, unattractive working conditions.

DUST can be explosive, hazardous to health, valuable, or it can be worthless and a nuisance. Regardless of its characteristics, uncontrolled DUST always results in higher operating costs and reduced profits.

If your operations indicate a need for dust control, our 35 years' experience exclusively in this field can prove valuable to you. DRACCO engineers can eliminate your D factor by furnishing a high efficiency DRACCO Dust Control system accurately designed to meet your specific needs.

It will pay you to analyze your D factor and to write for complete data on a DRACCO installation as applied to your problem.

DRACCO CORPORATION
4070 E. 116th St., Cleveland 5, Ohio or
415 Lexington Avenue, New York 17, N. Y.

AGENTS IN PRINCIPAL CITIES

DRACCO *Performance Proved*
DUST CONTROL EQUIPMENT
PNEUMATIC CONVEYORS • METAL FABRICATION

Hand-operated joggle machine places joggles at desired spot in metal strip

at Convair tackled the problem and details were worked out in the manufacturing methods development group. The result is a comparatively inexpensive hand-operated machine to put joggles in strips of metal.

Essentially, the hand-operated joggle machine consists of a set of jaws which hold one side of the metal piece to be joggled. Opposite this is another set of jaws which are movable. When the operator moves the hand controls, the movable jaws move and give the metal the bends necessary to produce the required joggle. *From Convairiety, a publication of Consolidated Vultee Aircraft Corp., San Diego 12, Calif.*

Handy Rack for Motor Brackets

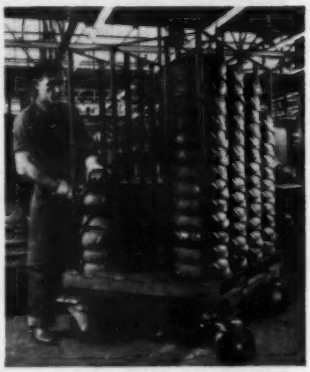


Photo: Westinghouse Electric Corp.

Pin-type rack on specially built caster truck holds up to 300 finished motor brackets. It can be moved easily to assembly area when parts are needed

Infrared Heat Boosts Production

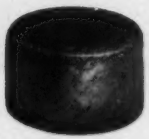
PRODUCTION OF latex foam sponge rubber at Lien Rubber Manufacturing Co., Los Angeles, has been accelerated 50 per cent by the use of infrared heat during the curing stage in place of hot water used formerly. The hot water method left water spots on the finished product, resulting in a large percentage of rejects.

In the new method the latex foam compound is poured into molds which are immediately conveyed through the zoned infrared oven.

(Continued on page 30)

Toothed Lock Washer: Prevents loss of stem nut due to vibration, thereby holding the handwheel securely.

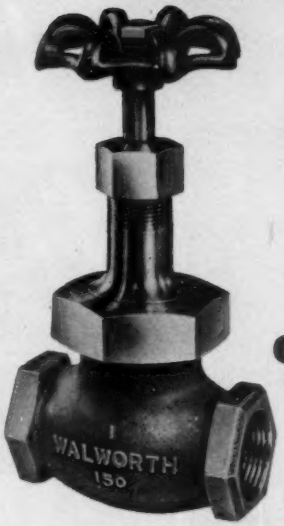
Newly Designed Handwheel: Air-cooled, finger grip handwheel affords sure grip even with greasy gloves.



Improved Packing: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure.

Hexagonal Union Bonnet Connection: Eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and assembled.

WALWORTH



IMPROVED
No. 95
BRONZE
GLOBE VALVE

also available in Angle Type (No. 96)

The service ratings of the Walworth No. 95 are 150 pounds per square inch steam at 500F, and 300 pounds per square inch non-shock cold water, oil, and gas. In the manufacture of this quality bronze valve, more than 47 gages are used in machining parts to micrometric accuracy, thus insuring interchangeability of parts. For further information see your local Walworth distributor, or write: Walworth Company, 60 East 42nd St., New York 17, N. Y.

note these 7 Great Features

WALWORTH
valves and fittings

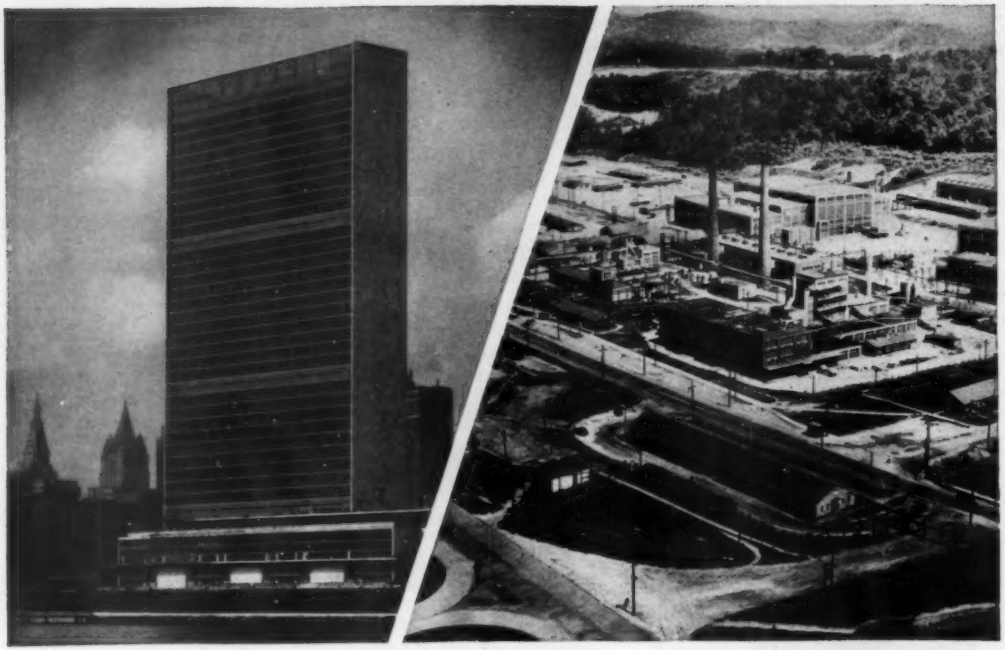
60 EAST 42nd STREET NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

New Cylindrical Disc Holder: The design of the top portion of the disc holder keeps the disc accurately guided under all operating conditions.

Renewable Asbestos Disc: This disc is suitable for steam up to 500F and is resistant to oil, gasoline, and many chemicals at atmospheric temperatures. Discs for special services are available.

Extra Strong Body: Made of Composition M (ASTM B61) bronze thick enough to provide a high safety factor. Valves undergo hydrostatic shell test of 450 psi.



Where History is Made..

THEY USE TRUMBULL PRODUCTS TO DISTRIBUTE AND CONTROL ELECTRIC POWER

Speed of installation . . .

Dependability of performance.

These are the reasons why the builders of Oak Ridge . . . like the builders of The United Nations' new headquarters . . . so often used Trumbull products for distributing and controlling electric power.

In the apartment houses and schools, for example, they used Trumbull load centers equipped with automatic circuit breakers. And in the Atomic Energy Commission plants, they used Trumbull switchboards and motor control centers.

MORE NEWS FROM TRUMBULL

Since the building of Oak Ridge, Trumbull has developed many new products of the same types.

Trumbull's new load center—called Trumbullite—is the first to have plug-in circuit breakers with quick-make, quick-break operation.

And Trumbull's motor control centers are now in the form of CENTR-A-POWER, in which standardized starter-and-disconnect units are grouped in prefabricated, rigid steel troughs, in any arrangement.

What better testimony to product acceptance . . . than to have it adopted where, for peace or war, the atomic energy plant was built . . . and where, for peace, The United Nations is erecting its permanent headquarters?

TRUMBULL (T) ELECTRIC

PLAINVILLE, CONNECTICUT

Remember the trade marks "tt" and "TUBE-TURN" are applicable only to products of TUBE TURNS, INC.

the engineered way to put an end to a pressure problem

Write Dept. D-10 for free booklet giving Dimensional Data on types, sizes and materials of TUBE-TURN Welding Fittings and Flanges.

WHEN IT COMES to containing pressures—in a header or pressure vessel or in merely blanking off a line—your safest, surest bet is a TUBE-TURN Welding Cap. Formed to 2:1 semi-ellipsoidal contours, it represents the ideal pressure-resisting closure for a cylinder. No makeshift capping method can approach its bursting strength which is actually far greater than seamless tubing of like thickness and grade of steel.

Another important point: TUBE-TURN Welding Caps are manufactured to meet ASME Boiler Code requirements and the chemical-physical standards of ASTM specification A106 for Grade A and Grade B carbon steels.

For welding caps and for all TUBE-TURN Welding Fittings and Flanges, see your nearby TUBE TURNS' Distributor. You'll find one in every principal city.

"Be sure you see the double tt*"*

TUBE TURNS, INC. LOUISVILLE 1, KENTUCKY

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Chicago • Houston • Tulsa • San Francisco • Los Angeles

TUBE TURNS OF CANADA LIMITED, CHATHAM, ONTARIO... A wholly owned subsidiary of TUBE TURNS, INC.

New Ford Power Plant features welded piping

Power station for Ford Motor Company's giant new engine plant and foundry, now being built in Cleveland; F. A. Fairbrother —Geo. H. Miehls, Architect and Engineer; Albert Kahn Associates, Consultants. Engine plant will be equipped with the last word in automatic machinery—to save production man-hours. The designers believe in saving maintenance man-hours too. Thus at the power plant, which will supply 360,000 pounds of 150-lb. steam per hour for heating and process, an all-welded piping system with TUBE-TURN Welding Fittings and Flanges was specified. Welded steam, air, and condensate lines are permanent and leakproof.

Here the 18" steam main from the power plant leads to a fabricated "Y" connection, then through tunnels to foundry and engine shop. One side is stepped down through a TUBE-TURN Welding Reducer to a 16" line; the other side through another TUBE-TURN Welding Reducer to a 12" line. Special "Y" connection was made by cutting and welding two 45° Welding Elbows, a job that calls for uniform wall thickness and concentricity throughout the fittings—a point of pride with TUBE TURNS, INC.

In engine shop, smaller lines designed to carry coolant oil to machine tools are also welded. Wide range of TUBE-TURN Welding Fittings and Flanges—including more than 4000 different items—simplifies installation job. Leakproof piping will free maintenance personnel for other work.

Despite close quarters in tunnel, fabrication goes ahead swiftly. Welders and contractors like to use TUBE-TURN Welding Fittings because they know that dimensions are always accurate, thus line-up is easy. Welded lines can be fitted closely together, will make for a neat installation. With no flanges to work around, insulation can be applied easily.

TUBE TURNS, INC., Dept. D-10
224 East Broadway, Louisville 1, Kentucky

Your Name .....

Position .....

Company .....

Nature of Business .....

Address .....

City ..... *State* .....

DISTRICT OFFICES

New York	Houston
Philadelphia	Tulsa
Pittsburgh	San Francisco
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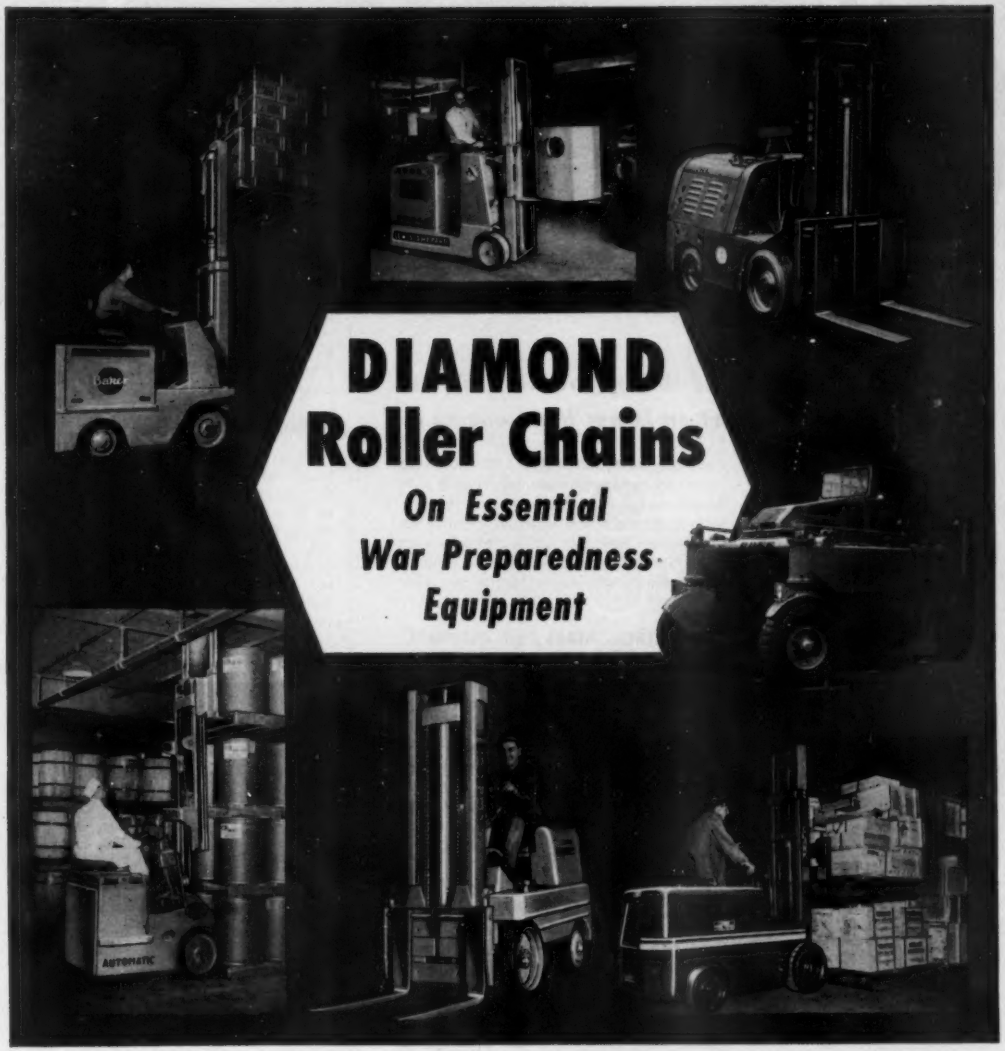
"tt" and "TUBE-TURN" Reg. U.S. Pat. Off.

TUBE TURNS, INC.

LOUISVILLE 1, KENTUCKY

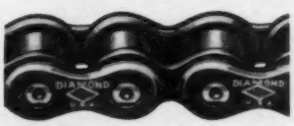


● Diamond Roller Chains are incorporated in the design of a host of materials handling, conveying, and transporting equipment because they provide the simplest and most dependable method of power transfer. Such equipment, useful in all of industry's work, becomes indispensable when strenuous, long-hour war preparedness production is undertaken.

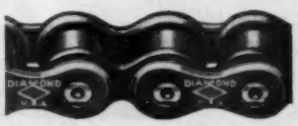
Of vast importance, therefore, is the selection of Roller Chain well established for its high uniform quality, efficiency and great reserve strength without which the maximum value of such equipment cannot be provided.

On the smallest units up to and including big Diesel locomotives, Diamond Roller Chains are performing daily up to standards established and proven through over 60 years of chain manufacture.

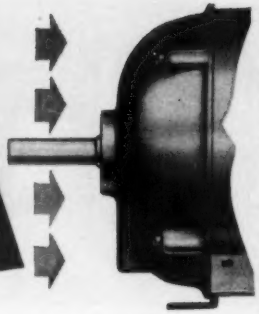
DIAMOND CHAIN COMPANY, Inc.
Dept. 614, 402 Kentucky Ave., Indianapolis 7, Indiana
Offices and Distributors in All Principal Cities
Refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



DIAMOND ROLLER CHAINS



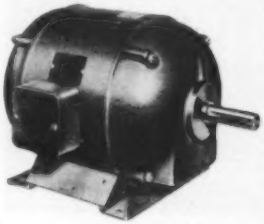
HERE'S *Full-Height* MOTOR PROTECTION



Shrouded End-Heads give R&M Motors a Head Start on Lower Maintenance

OPENINGS ARE SCREENED

Openings are screened in standard All-Weather Motors to exclude rodents attracted by warmth, and prevent the entry of air-borne debris which might obstruct air passages. R & M high-velocity end-to-end "Clean-Sweep" ventilation has no converging currents to deposit clogging dirt.



Types include drip-proof, splash-proof, explosion-proof, totally enclosed fan-cooled, and vertical motors with drip-proof or splash-proof housings. Sizes range from 1 to 7½ h.p. for single-phase and d.c.; from 1 to 50 h.p. for polyphase. Drip-proof motor shown.

The extra protection of R & M end-heads is a "*plus*" all users appreciate, for—like R & M Weatherizing—it guards internal motor parts from harm and serious damage. You can see for yourself how this full-height enclosure sheds falling liquids and objects—why open-type motors, *even outdoors*, require no other cover.

"ALL-WEATHER" MEANS "USE ANYWHERE"

This *special kind* of standard motor is the finest we've ever built—the finest you've ever used. It's ideal for any environment . . . where it's dry, dusty, humid, damp; in mild acid or alkaline fumes. And R & M Quality in bearings, windings, insulation—in *every* construction detail—is carefully preserved for longer life by exclusive design or shielding.

PROTECTED INSIDE AND OUT

Nowhere else can you get the performance protection of R & M All-Weather Motors. FIRST, shrouded end-heads. SECOND, rotor and shaft are rust-inhibited. THIRD, stator and shell have a baked-on coating of moisture-resisting "Robbinite." FOURTH, cast-iron end-heads and terminal box receive anti-corrosion treatments. FIFTH, terminal box is gasketed. SIXTH, lead-ins are sealed. SEVENTH, end-head openings are screened. EIGHTH, repellent grease keeps moisture away from the extra-wide, sealed ball bearings.

AN EASY WAY TO CUT MAINTENANCE

Don't be satisfied with *less* than R & M All-Weather excellence. These cool-running, long-lasting motors sell at the *standard motor* price. And when you buy new powered equipment, specify "Robbins & Myers." Write for the All-Weather Story. Bulletin P-400-E.

R&M means Reliable Motors

ROBBINS & MYERS • INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO

MOTORS • HOISTS • CRANES • FANS • MOYNO PUMPS

(Continued from page 24)

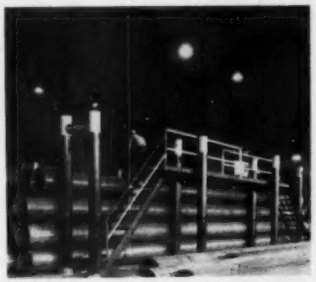
The first zone, containing four heaters at the top and four at the bottom of the oven, provides rapid heating; the second zone, having two heaters above and two below, adjusts the mold temperature to 200 F; the remaining zones, with single heaters above and below the oven, maintain this required temperature. After leaving the oven, the molds are water cooled to bring the temperature down to about 70 F.

This curing method permits delivery of 25 molds an hour or 400 a day on two 8-hour shifts, compared with the previous capacity of 16 molds an hour or 384 a day on three 8-hour shifts. *From a news release for Edwin L. Wiegand Co., Pittsburgh 8, Pa.*

Stairways Serve Pipe Racks

PERMANENT STEEL stairways and platforms were installed at pipe storage racks on the finishing floor at Brier Hill Electric Weld Tube Mills to simplify the pipe-handling job. The stairways eliminate the use of ladders and make it unnecessary for the men to climb the sides to mount the piles of pipe when making crane hitches.

The permanent installation is between pipe pockets and serves two



Stairways and platform installed at storage racks makes handling task easier

storage racks. A single railing has been placed on opposite sides of each stairway, making it easy for the workmen to step onto the pipe pile from either side and at any height, without crawling under the handrail. *From Youngstown Bulletin, a publication of The Youngstown Sheet and Tube Co., Youngstown 1, Ohio.*

Planned Layout Improves Doll Shop Operation

TWENTY THOUSAND plastic doll parts are polished in one day at the Ideal Toy Corp., Hollis, N. Y. To achieve this high rate of production, special parts bins, work benches, polishing equipment, and a dust control system have been designed, laid out and installed.

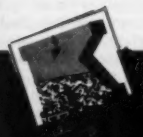
Bins containing unpolished arms and legs are arranged, back to back,

Absorption Control*

¼ of a billion square feet in use prove they are HARDER, TOUGHER, LONGER - LASTING

Study a **Kalman** *Floor*

1. **THE SURFACE** – Uniformly hard and smooth over every square foot. No "soft" or "weak" spots. Resistant to roughest wear and "dusting". Easy to maintain. Achieved by Kalman "Absorption Control".
2. **THE TOPPING** – A dense, compact mass. Aggregate is distributed evenly. Voids are almost completely absent. Achieved by Kalman "Absorption Control".
3. **THE AGGREGATE** – Hardest, toughest stone obtainable. Used in maximum quantity. Tested for gradation and crushing strength.
4. **THE COMPLETE ADHESION TO THE UNDERSLAB** – Correct preparation of the underslab plus Kalman "Absorption Control" assure *permanent* adhesion.



Kalman CONCRETE **Floors**

KALMAN FLOOR COMPANY, INC. 110 East 42nd Street, New York 17, N. Y.

MAGNESIUM CHIPS

SAND FROM WHEEL PITS

SPENCER VACUUM IN THE *Metal* INDUSTRIES for

A recovery of tons of babbitt, or pounds of solder flux and gold, or the cleaning of hot pits without waiting for them to cool are essential applications of Spencer Vacuum introduced in the speed-up during the last war. Delicate instruments were bench assembled, inspected and cleaned in half the time, and thousands of products made ready for painting or enameling in minutes instead of hours.

Withall, the same machine improved the sanitary conditions of busy plants and removed bulky materials from floors and dangerous dusts from pipes, ceilings and walls.

There are more than 100 essential industrial economies illustrated in Spencer Bulletin No. 144—yours for the asking.

BENCH CLEANING
METAL RECLAIMING
MILLING CHIPS
SOAKING PITS
SUMP CLEANING
TANK CLEANING
TIN PLATE CLEANING
WELDING FUMES AND FLUX AND
ALL AROUND SANITATION

SPENCER 1½ H.P. INDUSTRIAL PORTABLE

427-B

THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER HARTFORD

in two rows. Bin fronts taper outwards and have V-shaped openings to direct the flow of the bin contents for easy reach of the operator. A lip-tray in front of each bin holds a few pieces of stock from which the operator works. Work is brought to the bins by the foreman so the operators won't loss working time. The operators in one row face opposite those in the other. This arrangement permits each man to reach into his bin with the right hand. Finished pieces are deposited in a fibre-drum container to the operator's left.

Photo: Pangborn Corp.

Large exhaust pipe conveys dust from polishing machines to dust collector

The electric motors of the polishing machines have discs mounted on their spindles. Ends of strips of sandpaper are secured to the edges of the discs and the free lengths hit against the arm or leg being polished as the spindles rotate.

A large exhaust pipe runs under the bins and is connected by smaller 4-in. pipes to dust control exhaust hoods covering the polishing wheels. This piping system pneumatically conveys dust from the polishing machines to a dust collector on the roof. *From a news release of Pangborn Corporation, Hagerstown, Maryland.*

Graphite Cover Tested In Descaling Operations

TESTS ON THE use of finely divided graphite as a cover for a sodium hydride descaling bath show that a substantial savings in material and operating costs are being realized in a number of plants cleaning metals and alloys by this process.

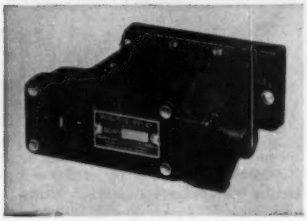
The use of graphite cover in commercial operations has resulted in a simple and effective procedure of placing an adequate graphite cover on the bath. All that is necessary is to float sufficient material on the surface to form a layer about ½ to 1 in. thick. From 0.6 to 0.9 lb psf is usually sufficient.

Using a scoop or shovel, graphite is placed on the bath surface at several points and it immediately spreads out to form a dry, fairly uniform layer. When work is introduced, the molten caustic wets the graphite, forming a cover having a silvery sheen and foam-like characteristics. Steady working of the bath keeps the layer fluid.

J. H. HOGSETT OF PITTSBURGH COKE & CHEMICAL CO. SUBMITS WINNING IDEA IN CONTROLS DERBY

A diagram and description of the utilization of two Honeywell Control Relays for the automatic maintenance of liquid level has won a Honeywell Electric Clock Thermostat for J. H. Hogsett, Instrument Supervisor for the Pittsburgh Coke & Chemical Co.

This application of Honeywell Automatic Control replaces the hand operation of a valve, at frequent intervals, to avoid the overflow of a liquid building up in a storage vessel. Under the previous system, the operator was required to take readings from an indicating gauge in order to determine the rate of accumulation of the liquid. Constant level control was not required, but care had to be exercised in periodic "dumping" of the liquid by means of the hand valve—to prevent overflow. Mr. Hogsett reports complete satisfaction with the present means of automatic control—incorporating two Honeywell Positive Acting Relays, in series, to control



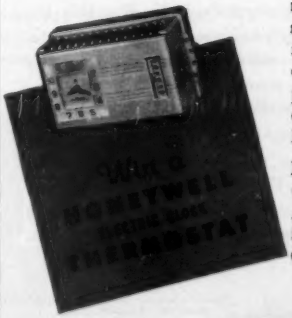
Honeywell RO49A Relay

the level between high and low set points. At high level, air pressure causes the diaphragm valve to open. At low level, air pressure is permitted to bleed off—and the liquid builds up in the vessel.

NEWSPAPER FOR PLANT ENGINEERS ANNOUNCED

Honeywell's Industrial Division now has a periodic publication—Industrial Control News—which contains detailed information on many new and unusual applications for automatic controls throughout industry. In its pages, production and maintenance men tell how they are reducing costs and increasing operating efficiency on all types of equipment. According to a recent release from the company, anyone interested in industrial controls can contribute to *Industrial Control News* . . . and can receive copies . . . by sending name, company, title and address to Minneapolis-Honeywell Regulator Co., *Industrial Division*, Station 70, 4491 Wayne Ave., Philadelphia 44, Pa.

do you have an [redacted] for the HONEYWELL CONTROL DEVICES DERBY?

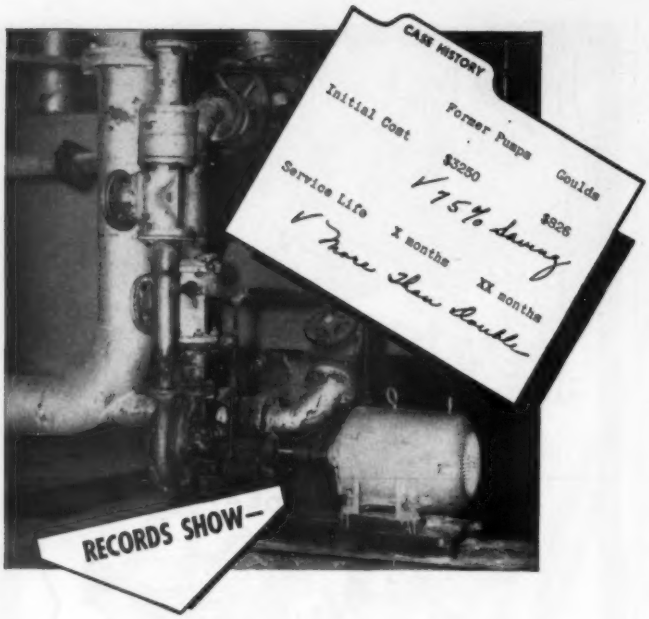


Just send us a sketch and description of how a non-indicating control device is now being used to help keep things running smoothly in your plant. Think about it! Then send it in! An impartial board of judges will rate it in terms of its importance to the maintenance of plant operations. You may win a Honeywell Electric Clock Thermostat!

Minneapolis-Honeywell Regulator Co., *Industrial Division*, 4491 Wayne Ave., Phila. 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

MINNEAPOLIS **Honeywell**

Brown Instruments



How a manufacturer cut costs tremendously with Goulds stainless steel pumps...

When handling corrosive liquids, pumps alone can be an important item in your processing budget. One alert plant engineer in the southwest cut his pump costs to about an eighth of what they had been.

The pumps he had been using for an especially erosive crystaline slurry cost $3250. When they wore out he replaced them with Goulds Stainless Steel Centrifugals for only $826. But this tremendous saving in initial cost was only half the pay-off. The Goulds pumps have already been in service *twice as long* as the ones they replaced . . . and they're still going strong.

The advanced design and simple construction of Goulds pumps make these savings possible. Bearings are prelubricated and fully protected. Stuffing boxes are under suction pressure to prevent leakage and assure long packing life. Parts are interchangeable. The impeller clearance can be adjusted for wear. Available in 9 sizes with capacities to 750 G.P.M. Send us the coupon today for full details.

PUMPS INC. Goulds Seneca Falls New York

GOULDS PUMPS, INC.
Dept. PE, Seneca Falls, N. Y.
Send Bulletin 725.3 on Goulds Stainless Steel Centrifugal Pumps.
Name_____
Company_____
Address_____
City_____ Zone___ State_____

Upon standing without agitation, the upper portion of the cover often freezes due to the low heat transfer rate of the graphite. This crust can easily be broken, however, and one or two up-and-down movements permits withdrawal of the work without excessive drag-out. From ½ to 1 lb of graphite per square foot of bath surface per day is usually sufficient to maintain a satisfactory cover for baths having moderately heavy work loads.

When the work is quenched, any material carried over from the descaling tank is blasted from the work together with the reduced scale. Inspection of the subsequent brightening tanks has failed to show any signs of graphite carry over. The surface of the finished work is smooth, clean and free from graphite.

Another factor which was studied was the possibility of carburization of the work during treatment in a graphite-covered bath. This possibility of carbon pick-up has been disproved by the tests, even for work treated for prolonged periods of an hour or more. Duplicate samples of scaled and previously cleaned bars of extra-low carbon stainless steel showed the same carbon gradient analyses before and after treatment.

The following advantages of the graphite cover have been confirmed by tests made under actual plant conditions: 1. Heat loss from the bath (surface radiation) is reduced 25 to 40 per cent; 2. Consumption of sodium and ammonia is cut 25 to 60 per cent; 3. Down-time and labor necessary to build up sodium hydride concentration after idling is eliminated; 4. Drag-out is reduced because of higher bath temperatures; and 5. Production rate is increased. *From Modern Metal Finishing, a publication of E. I. Du Pont De Nemours and Co., Wilmington, Delaware.*

Maintenance Has Another Helper

TIME IS MONEY these days and two-way radio is a time-saver at Baytown Refinery. In the old days, a rigger crew working on the west

The operator of a mobile crane receives radio instructions about the next job

CONTROL YOUR FEED

BUILD UP YOUR PROFITS . . . THIN OUT YOUR LOSSES

With Jeffrey-Traylor Feeders on the job the flow of coal (or other material) is under absolute control at all times. Photo shows two No. 5 J-T Feeders under track hoppers and feeding to Jeffrey Spiral Conveyor which takes coal to the various bunkers ready for use.

You virtually put your power plant on a strict diet . . . the feeders regulating the amount to be fed, exactly . . . just set 'em and forget 'em. J-T electric-vibrating Feeders are practically foolproof . . . nothing to wear out or lubricate. Power consumption is unusually low.

We build a type and size Feeder (desired capacity) to take care of your feeding requirements properly — tubular or pan decks, single or multiple power units. We also apply electric vibration to Conveyors, Screens, Dryers, Coolers and Packers. To be sure — better buy Jeffrey.

PARTIAL LIST OF WHAT WE MAKE

BIN VALVES • BUCKET ELEVATORS • CHAINS • COOLERS • CONVEYORS • CRUSHERS • DRYERS • IDLERS (BELT) • FEEDERS
PULVERIZERS • WEIGH FEEDERS • PACKERS • SCREENS • CAR PULLERS • SPROCKETS • TRANSMISSION MACHINERY

Literature On Request

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ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

"Reduce heating costs 15%-25%"

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CAST FRAME KEEPS PARTS ALIGNED
SELF-COOLED MOTOR NEVER "SLOW-ROASTS"
NO BRAZED, SOLDERED OR WELDED JOINTS
DYNAMICALLY BALANCED FAN WHEEL
BOTTOM HEADER "FLOATS"

● Here's your opportunity to save fuel dollars every day, due to high efficiency heating of ILG Unit Heaters. Also, you can economize during years and years of operation by minimizing power and maintenance costs. Call our nearby Branch Office (consult classified directory) or send coupon—get the facts on how other companies are changing wasted heating dollars into profits. Complete data and prices . . . or a free heat survey is yours for the asking!

ILG UNIT HEATERS

STEAM • HOT WATER • ELECTRIC • GAS-FIRED

☐ Please send free Bulletin "Performance is the Pay-Off".

Firm Name _____

Individual _____ Title _____

Address _____

City _____ State _____

Free! Colorful bulletin on today's best buy for your heating dollar.

side of the plant, after driving about two miles across the plant to the rigger shack, would find that the next job was just a short distance from the one they had just finished.

Today, riggers, electricians, laborers, and other maintenance people in the refinery are directed, without loss of time, from one job to another by two-way radio.

Each of six groups, including the medical and fire departments, has a dispatcher who receives telephone calls from all over the refinery telling him of jobs to be done. He keeps in contact with each piece of equipment working for his group, assigning jobs to the nearest unit. By clearing through the chief dispatcher at the transmitter by telephone, he obtains permission to go on the air to direct a unit to a new job.

In turn, mobile units can radio the dispatcher, using his call number, to report, request supplies, or ask for a new assignment. *From The Humble Way, Humble Oil and Refining Co., Houston 1, Texas.*

MH Cuts Loading Time

Photo: Automatic Transportation Co.

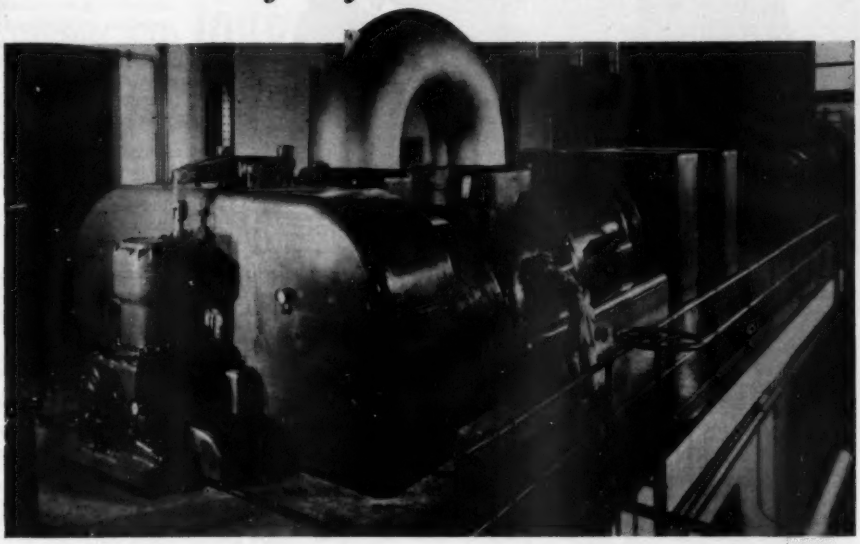
After loading the furnace car with three bins containing ball bearing rings, the fork truck then backs the load into furnace at the Fafnir Bearing Co., New Britain, Conn. This system has cut loading time for the company's five annealing furnaces to two hours

Corner Cupboard Economies

The old-fashioned corner cupboard, popular in an era when space was at a premium, fairly illustrates the guiding principle behind Martin Company's current program for emergency expansion of its facilities.

Utilization of plant space by government contractors has been carefully scrutinized by the Armed Forces. In setting up the machinery for measurement of plant productivity, the Navy and the Air Force have differentiated between direct and indirect floor areas. Direct floor area is defined as space used for the actual fabrication and assembly processes. Indirect area includes not only all engineering, service and office space, but inspection and storage locations in excess of 400 sq ft, and aisles used as thoroughfares on the shop floor.

2 ways to insure a clean lubricating system for your new turbine . . .



FLUSH with Gulf Turbine Flushing Oil

FILL with Gulfcrest, the world's finest turbine oil

By taking these two steps, you can insure top lubricating efficiency down through the years for your new steam turbine.

The use of Gulf Turbine Flushing Oil—before the initial fill of lubricating oil—will remove grease-type slushing compounds and carry away harmful abrasives which might be in the circulating system. And, it protects all oil-bathed surfaces against rust. Because Gulf Turbine Flushing Oil is itself a satisfactory lubricant, the undrained portion does not impair the lubricating value of the turbine oil.

Then, to keep the new system clean, fill with Gulfcrest Oil. Because of its outstanding resistance to oxidation, Gulfcrest maintains an exceptionally low neutralization number, and lasts indefinitely. With this quality oil and good operating practice, you can be sure there will be no sludge deposits in cooler tubes, bearing pedestals, or oil lines to worry about.

To get these benefits for your new turbines, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company

GULF BUILDING, PITTSBURGH, PA.

FIFTY YEARS OF SERVICE 1901 GULF 1951

PETROLEUM AND ITS PRODUCTS

on a business tour... his investment's secure

With today's extended delays in replacements, dollars mean less and less protection, when fire strikes. No chance of extensive cutbacks in vital production, loss of day-to-day revenue or decrease in customer good will, when your investment in materials, equipment and buildings is fully protected from the ravages of fire with efficient, quick-acting C-O-TWO Fire Protection Equipment.

No matter what your property . . . factory, mill, warehouse, power station or research center . . . or a particular fire hazard such as spray booth, dip tank, pump room, electrical equipment enclosure or record vault . . . there is a type of C-O-TWO Fire Protection Equipment that gives you fast, positive action the instant fire strikes. Whether it's a C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguisher for an incipient fire, or a C-O-TWO Built-In High Pressure or Low Pressure Carbon Dioxide Type Fire Extinguishing System for total flooding an entire fire hazardous area . . . C-O-TWO means experienced engineering that assures you of the best type equipment for the particular fire hazard concerned.

For example, at many locations a C-O-TWO Combination Smoke Detecting and Fire Extinguishing System is a "must." The first trace of smoke in a protected area sounds an alarm . . . then fast, clean, non-damaging, non-conducting carbon dioxide blankets the fire, putting it out in seconds, before it spreads and causes extensive damage . . . no after fire mess, no water damage with carbon dioxide.

So, whatever your fire protection problem, let an expert C-O-TWO Fire Protection Engineer help you in planning complete and up-to-date fire protection facilities now. Write us today . . . tell us about your particular fire hazards . . . no obligation.

C-O-TWO

C-O-TWO FIRE EQUIPMENT COMPANY

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MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

Drafting rooms, laboratories, an experimental shop, tool engineering areas, and miscellaneous service offices such as accounting, protection, maintenance, cafeterias and shipping are considered indirect plant areas within the manufacturing facility.

Rearrangement of office furniture, accounting machines, laboratory apparatus, service and repair benches, cafeteria tables and other such items contribute a great deal toward the over-all saving of space. These economies are realized chiefly through the recommendations of the Plant Engineering department, as coordinated with the various departments concerned.

The bulk of the space savings, however, must be found in a minimizing of the amounts of direct floor area required for air-frame fabrication and assembly. Organized for this express purpose, the Layout and Equipment Planning Section of Tool Engineering maintains a close liaison with engineering design, so that the required types and quantities of tools and fixtures can be determined well in advance for each project.

Tool planning thus goes on simultaneously with the basic design of the aircraft, while plant layout is often completed—on paper, if not actually on the shop floor—before the final engineering release has come through. *From The Martin Star, a publication of The Glenn L. Martin Co., Baltimore 3, Md.*

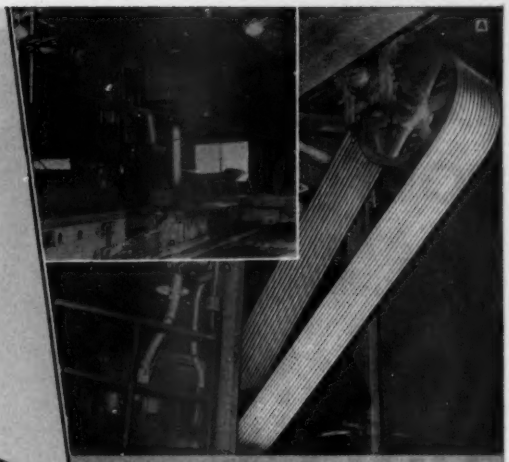
Split Funnel Threads Wires

THREADING ELECTRICAL harnesses through bulkhead holes in B-36 bomb racks is a painstaking job. Complicating the task are elastic grommets that must fit snugly around the wires holding them in place and protecting them as they pass through the bulkheads.

The suggestion of F. J. Araiza

Electrical harnesses are slipped through bulkhead holes by use of split funnel

Prove for yourself why Gates Vulco Ropes are giving you longer V-Belt Wear!



This big bandmill, in the Masonite Corp. plant at Ukiah, Calif., is driven by Gates Vulco Ropes. The saw has a capacity of 200 thousand board feet of lumber in 8 hours.

There is a very simple reason why Gates Vulco Ropes—the V-belts built with *concave sides*—are giving you substantially *longer wear*—and you can easily prove this for yourself in just 2 minutes' time!

Pick up *any* V-belt whatever and bend it as it bends when going around a pulley. As the V-belt bends, grip its sides with your fingers—and here is what will happen, every time.

If the belt you are bending is a *straight-sided* V-belt, you can *feel* its sides *bulge out* as the belt bends. This out-bulge forces the sides of the belt to press *unevenly* against the V-pulley—as shown in figure 1-A (see accompanying diagrams).

Clearly, this *uneven pressure* against the V-pulley causes the belt to wear *unevenly*—with the wear *concentrated* where the bulge is greatest—and this concentrated wear at one point naturally shortens the life of a *straight-sided* V-belt.

Now, make this same test with the belt that is built with Concave Sides—the Gates Vulco Rope!

Whereas you felt an *out-bulge* when you bent a belt with straight sides, you find that the *Concave Sides* merely fill out and become *perfectly straight*. The sides therefore *press evenly* against the V-Pulley. This distributes the wear *uniformly* across the *full width* of the belt. Naturally, this means longer belt life and *lower* belt costs for you!

Only V-Belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure that you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends

How Straight-Sided V-Belt Bulges in Sheave -Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-5110

Gates® Hose · V-Belts · Molded Rubber Goods for Industry

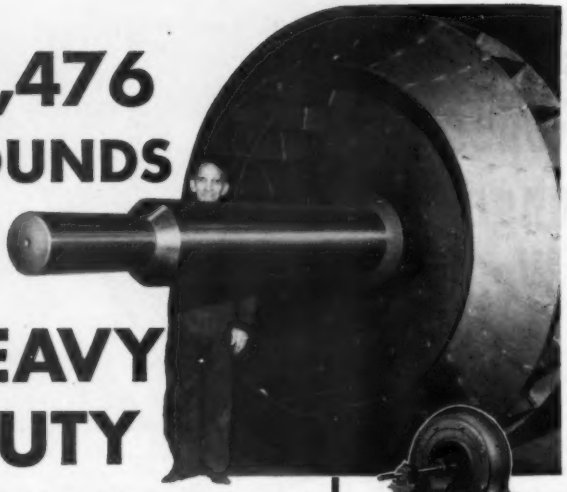
VULCO ROPE DRIVES

ENGINEERING OFFICES AND JOBBER STOCKS IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY • DENVER • U•S•A

World's Largest Maker of V-Belts

12,476 POUNDS of HEAVY DUTY CONSTRUCTION



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THERE'S NOTHING FLIMSY about a Clarage fan! Every part--wheel, shaft, bearings, housing--is **HEAVY-DUTY** construction.

We build equipment in which you can have complete confidence--for any air handling work under any operating conditions.

If you now use our equipment, you know exactly what we mean. If you are not familiar with Clarage performance, it certainly will pay you to find out.

You can--with profit--direct your next fan or blower inquiry our way.

CAST IRON EXHAUST FANS for handling fumes, smoke, dusts, corrosive gases, etc. Extra long life built in. 6 sizes.

BLOWERS for high pressure process air applications. Designed for high-speed, low-cost direct motor drive. 19 sizes.

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Application Engineering Offices in All Principal Cities

resulted in a funnel device which expands the grommets enough to get them easily in place. The metal funnel, made from a tin can, has a slit down one side which permits it to be bent open and removed. After repeated bending, the metal funnels soon break through, but they last long enough to do the job. *From Convairiety, a publication of Consolidated Vultee Aircraft Corp., San Diego 12, Calif.*

Paint the Shoe-Shine Way

Painting radiator tubes of electrical apparatus was a nagging problem until an employee came up with simple solution. A rubber gasket is used to paint the tubes. (From The Westinghouse News, a publication of Westinghouse Electric Corporation, Pittsburgh, Pa.)

Sealed Windows Maintain Temperature of Proving-Room

THE MINNEAPOLIS GAS CO. has sealed two opaque-glass windows with 176 sq ft of industrial batt insulation to help maintain the temperature of a new air-conditioned proving-room at its Lindale and Linden service building.

The two windows, each covering an area of 8 by 11 ft, were insulated with 4 in. thick mineral wool batt sections installed in the wood framing and covered with ½ in. thick plywood and paint. The framing was first constructed by nailing 2 by 4 in. studs vertically on 16 in. centers to wood sections along the sill and the top of the windows.

Mineral wool batts, in 15 by 48 in. sections, were placed in the 15 in. wide spaces in the framing. The paper overlap on the vertical edges of each wool batt section was then nailed to the framing in order to hold the insulation securely in place. Plywood sheets, in 48 by 96 in. sections, were then nailed to framing. *From a news release of Industrial Mineral Wool Institute, New York.*

EVEN OUR COMPETITORS' BEST CUSTOMERS INSIST ON SUNOCO WAY LUBRICANT

In the competition for industry's lubrication business, all refiners are constantly improving their products. Every so often, one company or another finds a way to make a petroleum product that, for a particular use, licks to a standstill anything its competitors can offer. Immediately the others dig in and try to find the secret. Until they succeed, the originator's ingenuity pays off in a rising flood of sales.

That is the happy position in which Sun Oil Company finds itself with its Sunoco Way Lubricant. Since its introduction eight years ago, no other refiner has been able to match this tableway lubricant. Here is proof any man in metalworking can appreciate:

Sunoco Way Lubricant is insisted upon by 188 metalworking concerns which buy all their other lubricants from our competitors.

In other words, our competitors have loyal 100% customers, just as we have; but when it comes to tableway lubrication, loyalty goes out the window and Sunoco Way Lubricant is specified.

The reason for the success of Sunoco Way Lubricant is that no one has been able to equal it for *protection of tableways . . . ability to prevent "stick-slip" . . . prevention of table flotation . . . resistance to wiping off or squeezing out under heavy loads.* These benefits add up to higher production, better finishes, lower maintenance costs, longer tool and machine life. That is why Sunoco Way Lubricant is approved or definitely recommended by 38 of America's leading machine tool builders.

Want to see factual case histories and learn more about this product? Send for illustrated booklet, "Sunoco Way Lubricant." Samples are available, too, to companies in the metalworking industry. Write Dept. PY-10.

SUN INDUSTRIAL PRODUCTS

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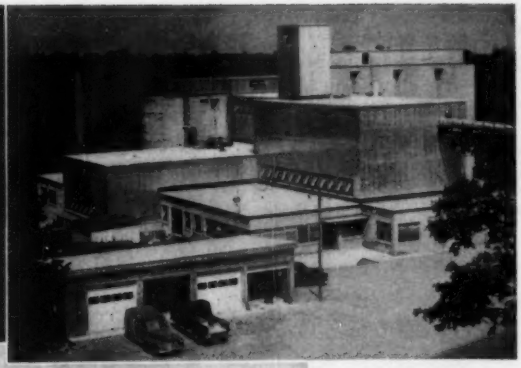
SUNOCO

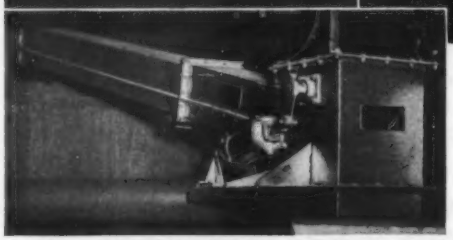
how F-K PUMPS and F-H AIRSLIDE®

convey talc at Gouverneur

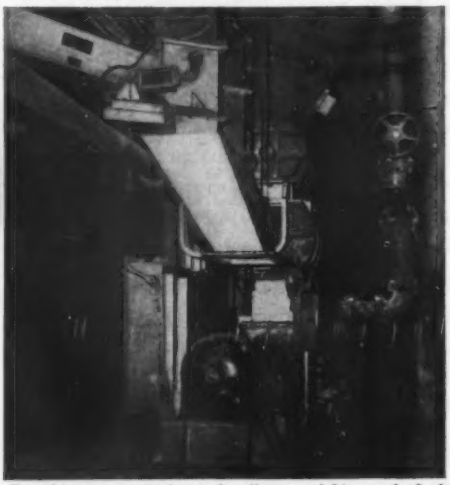
Safely Simply Efficiently Economically



Loading bulk talc in box car.



Airslide equipped with air motor-operated cut-off gate.



Portable pump underneath silos; variable-speed feeder attached to cone of silo. Airslide (upper left) from flat-bottom bin, for delivery to pump.

Gouverneur Talc Company has virtually standardized on Fuller conveying equipment in its Gouverneur, N. Y. plant. The Fuller-Kinyon Conveying System and F-H Airslide are used wherever possible.

The original installation consisted of four storage silos served by a Fuller-Kinyon Portable Pump, conveying to packer bin and bulk-car loading. Talc from these silos is delivered to the pump by variable-speed feeders which regulate the pump capacity to conform with packing facilities.

Later, storage facilities were increased by building a number of flat-bottom storage bins adjacent to the original silos. For economical, convenient movement of material from these bins, F-H Airslides were installed for delivery to the pump. Airslides are equipped with air motor-operated cut-off gates, actuated by bin-level indicators in the packing bin.

In addition to the F-K Portable Pump under silos, there are three other F-K Pumps installed in the Gouverneur plant, two for conveying from pulverizers, and one from dust collectors, delivering to silos and bins. Each pump is served individually by a Fuller Rotary Compressor, furnishing air for conveying.

Gouverneur is just one of the many plants which has streamlined operations with pneumatic conveying. Installation of this better method of handling materials will prove of great advantage to you. Why not have a Fuller engineer analyze your present conveying methods. He will recommend the most efficient and economical system for your plant. No obligation, of course.

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—COMPRESSORS AND VACUUM PUMPS—FEEDERS, AND ASSOCIATED EQUIPMENT

FULLER COMPANY
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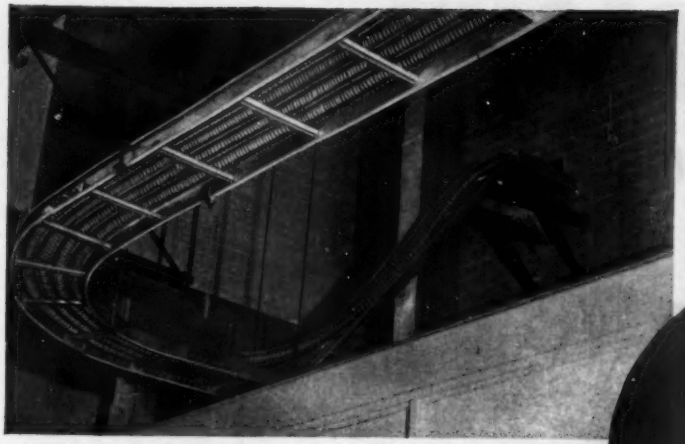
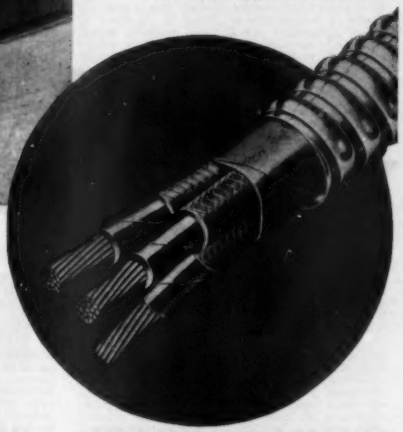
420 Chancery Building

G-65



Standard three-conductor, 600 v, interlocked armor cable. Also available for 110 v to 15,000 v circuits.



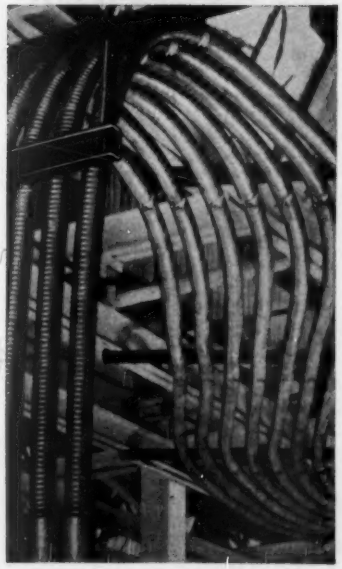
How can you cut power circuit installation time?

For almost twenty years the flexibility of G-E varnished-cambric interlocked armor cable has helped users cut installation time.

THE REASON: G-E interlocked armor cable for plant power circuits was specifically designed for fast installation in even the most difficult places. Its raceway is built in—ready to install. It is so flexible you can readily bend it around pillars, I-beams, and partitions—requires no special installation or time-consuming layout techniques. Because of its light weight, you can string G-E interlocked armor cable over long runs without pull boxes or lay it up on existing beams.

You save, not only time and space, but also initial material costs. G-E interlocked armor cable can even be used over again when plant layouts are changed.

To get complete data, write Section W77-1083, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.



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better performance

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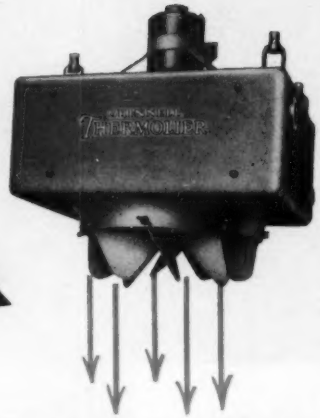
THERMOLIER
Unit Heaters . . .

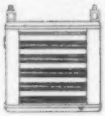


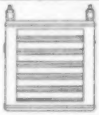
RIGHT DOWN

where maximum heat is desired...

4 MODELS . . . . . 18 SIZES

Vertical Delivery


Horizontal Delivery


Textile Model

Velocity Nozzle

A thermostatic trap, the simplest and least expensive of all traps, is practical because of Thermolier's exclusive cooling leg.

Maximum capacity assured, annoying destructive water hammer eliminated — by built-in pitch of tubes and internal cooling leg which assure continuous drainage of condensate.

Damaging strains caused by expansion and contraction eliminated by "U" type expansion tubes.

Safety and durability assured with leak-proof tube-to-header construction.

Five other important construction features. Write for Thermolier Catalog.

in warehouses, plants and other hard-to-heat buildings

HEATING COMFORT AND ECONOMY. Heat is forced down to the working level . . . not banked uselessly at the ceiling level. Thermoliers provide quick heating from a cold start. Desired room temperatures are easily maintained within a close range.

ADAPTABILITY TO EQUIPMENT AND FLOOR LAYOUT. The units and the simple piping are overhead where they do not interfere with arrangement of operating machinery or equipment and do not take up valuable floor or wall space. Units are easily relocated at any time to meet changes in plant layout or heating requirements.

LOW FIRST COST. Thermoliers are so efficient and so compact that their heating capacity is often equivalent to the capacity of cast iron radiation or pipe coils of twice the cost.

GRINNELL

WHENEVER PIPING IS INVOLVED

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Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems

BULLETINS just released and of immediate plant interest

PUMPS, COMPRESSORS

101 Steam Heating Pumps—Twenty-pp of information on vacuum and condensate pumps are presented in Bulletin 1401. Covers vacuum pumps from 2500 to 65,000 EDR, providing an illustrated description of vacuum pump operation, detailed data on working parts, a table showing standard air and water capacities, rating and testing procedures, diagrams of sample installations and dimensions. The section on condensation pumps, ranging from 2000 to 50,000 EDR, describes advantages for rapid return of condensate to low pressure boilers. Illustrates operation, gives capacity tables. C. A. Dunham Co.

102 Controlled Volume Pumping—Illustrated Bulletin 151, 24 pp, on controlled volume pumping will be of interest to engineers whose plant operations call for pumping a controlled volume of liquid in amounts from 3 ml per hour to 50 gpm. Describes features of company's pumps and includes data for selecting pumps for specific applications. Colored reference charts show in "stop-go-caution" style the relative corrosion resistance of construction materials to over 170 chemicals. Milton Roy Co.

103 Rotary Pump Service Manual—Although written for users of company's own rotary pumps and including a parts list, this little 20-pp booklet contains tips on installation and care applicable to practically all pumps of this type. Covers mounting, pipe connections, suction lines, pipe sizes, strainers, discharge lines, power, relief valves, speeds. Provides pointers on noisy operation, rapid wear, decreased capacity and loss of suction. Viking Pump Co.

104 Care of Pumps and Fittings—Planned Maintenance Manual 2, covering company's Flexflo pumps, valves, fittings and tubing, is an excellent 12-pp how-to-do-it booklet. Discusses correct installation, proper operation, adequate check-ups and cleaning. It's fully illustrated with photos and sketches and includes a check list trouble-shooting chart listing nature of trouble and items to be checked to remedy the condition. Cherry-Burrell Corp.

105 Industrial Pumps—This 12-pp condensed catalog describes company's line of turbine type and centrifugal pumps in both single- and two-stage units, also sump pumps, mixed flow pumps, condensation return units, close coupled pumps and deep well turbine pumps. Illustrated, includes construction specifications, condensed selection information, capacity data. Lists descriptive bulletins available on each type of pump. Aurora Pump Co.

106 Reciprocating Pump—Data Sheet 64A, 6 pp, describes manufacturer's recently developed 3-in. stroke direct flow triplex pump. Presents features of design and construction, dimensional drawings and performance data. Includes fluid-end and pump frame specifications. Lists industrial applications. The Aldrich Pump Co.

107 Vertical Turbine Pumps—Eight-pp Catalog 7228 describes company's Class APH-APK vertical turbine pumps, particularly applicable to bulk liquid transfer, cooling tower, dewatering or similar services where suction is taken from an open source. Tells advantages, explains construction features for both open, water-lubricated shaft or oil-lubricated enclosed shaft types. Ingersoll-Rand Co.

108 Condensate Return Units—Catalog Section 212, 6 pp, features an easy-to-use selection table covering company's vertical condensate return units. It gives EDR sq ft, capacity in gpm, receiver capacity in gallons, and range of models according to boiler pressure. Also describes in detail this new vertical design, which is particularly intended for installation where return piping is near floor. Roy E. Roth Co.

109 Heavy-Duty Compressors—Bulletin 222, 8 pp, is on manufacturer's Type BPPE heavy-duty, slow-speed, water-cooled variable volume compressors for compressing air and gases to pressures from 70 to 500 lb. Cross-section diagrams in color show construction and operation features. Also described is company's Quiet-Tite valve. Bury Compressor Co.

110 Blowers and Compressors—Bulletin 0500, 62 pp, just released, covers three types of centrifugal blowers and compressors: multi stage; single stage end suction, and single stage double suction, in capacities from 1000 to 150,000 cfm for pressures to 150 psi and above. Information is arranged in four sections, the first provides application data for blast furnace and Bessemer converter blowers, process industry uses, high pressure natural gas transmission, gas compressor or booster services, air for combustion, agitation, and other services. A section on design and construction includes descriptive data, cross sections and photos. Steam turbine and motor drives are covered in the third section and the fourth provides engineering data including curves, formulas and examples for computing compression of gases and pipe friction. De Laval Steam Turbine Co.

INSTRUMENTS AND CONTROLS

111 Gas Regulator—Eight-pp Bulletin P-296 introduces a gas regulator for pressure reduction service where regulation must be maintained with high sensitivity and accuracy, as on gas distribution systems, heat treating, boiler plants. Several models are presented. Sectional views show regulator's simplicity of design; principle of operation is explained, illustrated in color. Includes construction details on body and pilot assemblies, dimensional data, recommended operating limits. Fisher Governor Co.

112 Tension Indicator—Eight-pp Bulletin GEA-5512 describes company's Tensiometer, a device for continuous tension indication of cold-rolled strip in steel, brass and aluminum mills. Illustrated with photos and diagrams, covers mechanical and electrical operation, possible applications and auxiliary equipment. General Electric Co.

113 Instruments, Control Systems—Twelve-pp Catalog 51-3 presents manufacturer's line of instruments, control systems, regulating valves and desuperheaters. Covers draft and pressure instruments, boiler meters, recorders, thermometers, regulators, combustion controls, pump controls and many others. Illustrates each instrument, describes it briefly as to design and application and lists specific literature available on it. Republic Flow Meters Co.

114 Flow Signal Transmitter—Technical information on a high pressure type of flow signal transmitter is presented in 8-pp Bulletin 2551. Design and operation of the transmitter is explained and illustrated in color; seven applications are discussed, and various types of differential elements described. Covers operating characteristics, range adjustability, calibration of the instrument, dimensions. Hagan Corp.

115 Differential Converter—A mercuryless flow meter designed to feature fast speed of response for flow control and continuous range change adjustment from 0-30 to 0-200 in. of water, is introduced in illustrated Catalog 2281, 16 pp. Operating principles of this pneumatic-balance type flow transmitter are covered, as well as construction features, typical applications, detailed specifications and installation methods. Industrial Div., Minneapolis-Honeywell Regulator Co.

116 To Get Full Measure—Information on how to select electrical measuring instruments is provided in 30-pp Booklet B-4696. Seven basic factors are explained; types of instruments available in each major classification are listed on a full-page check chart; and four typical selection problems are solved. Complete lines of portable, switchboard, panel, recording and socket instruments are described and illustrated and functions of each are explained. Describes instrument auxiliaries. Westinghouse Electric Corp.

117 Pressure Transmitters—Engineering Data Folders 61, 69, 70 and 71 illustrate and describe a complete line of pressure measurement transmitters including a Bourdon tube pressure transmitter, a gage pressure bellows transmitter, and absolute pressure transmitter and a differential pressure cell, all featuring differential transformer type transducers and designed for use with standard recorders and indicating instruments having dead-beat response servo receivers. Include application data, operational features, available ranges, wiring and case diagrams. Automatic Temperature Control Co., Inc.

118 For Determining Steam Consumption—Bulletin R-153 explains design, construction, installation and operation of manufacturer's rotary condensate meter, an economical means of determining steam consumption where all condensate can be captured. Includes size, dimension and weight table, simplified piping diagrams for both gravity and vacuum systems, also photos of typical installations, cutaway drawings of rotor operation. American District Steam Co., Inc.

119 Temperature Regulators—Twelve-pp Bulletin T, Catalog 80, describes manufacturer's line of regulators for controlling temperature of liquids and gases, giving

October, 1951

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PLANT ENGINEERING

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applications, operating characteristics, construction specifications, dimensions. Eight instruments are presented covering temperature regulation for a wide range of heating and processing requirements. Fully illustrated, includes selection and application chart. Foster Engineering Co.

120 How Good Is that Furnace?—Form 926 describes and illustrates the Heat Prover, an instrument for measuring the combustion efficiency of any type furnace using any type fuel, giving both instantaneous and continuous readings. Tells how instrument works, explains advantages in checking performance of boilers, open hearth furnaces, kilns, heat treating furnaces, crucibles. Cities Service Oil Co.

121 Portable Anemometer—Two-pp Catalog 102, describes a meter for instantaneous direct readings of air velocities from 5 to 6000 fpm. This instrument operates from temperature differences rather than direct temperature measurements. Its applications, principle of operation are discussed, accessories pictured. Ranges, power characteristics and dimensions included. Hastings Instrument Co., Inc.

122 Combustion Control at Brewery—An 8-pp case history of modernization and expansion in the boiler room of a St. Louis brewery is given in Bulletin B-6. New equipment added, building changes, uses for steam and boiler conditions are described, pictured. Text, photos and schematic drawings trace the operation of the combustion control system, and results obtained with the new equipment are listed. The Hays Corp.

123 Automatic Compensator—Automatic compensation for temperature and/or pressure by company's automatic compensator is described in Catalog 975, 4 pp. Tells how this simple mechanical system provides accurate flow measurement, how compensator operates, offers wide range. Diagrams an installation and discusses applications. Penn Industrial Instrument Corp.

124 High Current Tester—Two-pp Bulletin C-1003-351 gives a detailed technical description of company's new Model 1002 Multi-Amp, a portable instrument for testing and calibrating current actuated devices. Multi-Amp Corp.

MECHANICAL POWER TRANSMISSION

125 Stock Chains and Sprockets—Thirty-pp Catalog C 55-50 gives details on list prices, available sizes of three types of stock sprockets and pertinent information on stock roller chain from 3/8 to 2 in. pitch. Includes data on drive selection, service factors, as well as illustrated installation tips and maintenance procedures. Explains economy and convenience of stock products. Morse Chain Co.

126 Speed Reducer Manual—Pocket-size Catalog 51 covering manufacturer's speed reducers and right angle gear motors gives 96 pp of engineering data on how to select proper speed reducer to fit requirements, including horsepower ratings, ratios and installation graphs. Includes parts list, descriptive material on gear types and sizes, also photos and listings of flexible couplings. Abart Gear & Machine Co.

127 Helpful Data on Chain Drives—Compiled as a helpful data book, 32-pp Catalog ED-51 offers a simple, quick means of determining interchangeability of various makes of roller and conveyor chains. Also supplies information of value in determining proper application of chain drives as a power transmission or conveying medium. Describes and illustrates chain parts and types, provides comparative data, conversion tables, helpful formulas, trigonometrical functions, etc. Whitney Chain Co.

128 Tackle Blocks—Catalog 51-b, 32 pp, presents company's complete line of tackle blocks. Covers ordering instructions, policy service, design features, mechanics of tackle blocks, and provides dimensional data, weights, safe working loads, etc. Essential parts of tackle blocks—shell, sheave or grooved wheel, center pin, straps and connections—also auxiliary parts are discussed in detail. The Upson-Walton Co.

129 Brakes for A-C Motors—Bulletin 1006, 2 pp, describes and illustrates high speed, shunt wound, magnetic brakes for squirrel cage and wound rotor motors for cranes, hoists, mill machinery. Discusses general features, applications, optional changes. Gives dimensions, weights, ratings of brakes and rectifier units. The Electric Controller & Mfg. Co.

ELECTRICAL

130 Induction Motors—Construction features of manufacturer's large end-shield bearing squirrel-cage induction motors are described and pictured in Bulletin 05B7542A. Built for a wide range of applications from central station auxiliary to general industrial drives, these motors come in ratings and speeds to 1750 hp at 1800 rpm, and bulletin points out that they can be had with electrical modifications to suit application requirements. Allis-Chalmers Mfg. Co.

131 Motor Starters for Hazardous Spots—This 8-pp folder illustrates and describes company's Explo-Safe and Weatherproof motor controls for hazardous locations. Gives dimensions, weights, ratings and wiring diagrams for these magnetic across-the-line starters said to be smaller and lighter than many motor starters. The Arrow-Hart & Hegeman Electric Co.

132 Power Factor Visualizer—A simple explanation of the use of capacitors in solving low power factor problems is available in the form of a slide-rule-type chart, Form SA-6730. This visualizer makes it possible to follow a hypothetical case involving low power factor and shows how installation of capacitors can solve this and similar problems. Explains what low power factor is, what it means to both power user and supplier, and benefits to be obtained by improving power factor in industrial distribution system through installation of capacitors. Westinghouse Electric Corp.

133 Distribution Transformer—Construction features of company's Curvacore transformer which combines wound type core with new insulation applications to provide a smaller unit with greater thermal capacity and better voltage regulation than previously possible with stacked core designs are described and pictured in Bulletin 61B7641. Includes dimensions for both conventional and self-protected types of oil-immersed, self-cooled, single-phase transformers. Allis-Chalmers Mfg. Co.

134 Battery Rack Specifications—Datasheets 72056, 72057 and 72074 give design specifications for single- double- and triple-tier racks for installing 12-, 24-, 30- and 60-cell batteries. Each sheet comprises keyed line drawings of rack type to which the particular sheet pertains and includes tables giving dimensions of racks to be used with different cell sizes. Length, width, height and number of rack sections required for four different types of batteries are included. Gould-National Batteries, Inc.

135 Mercury Switches—Four-pp Condensed Catalog Mg-1 covers five most popular designs of company's mercury switches, with selection and application aids, and complete electrical ratings and data for the use of these switches in both a-c and d-c applications. Micro Switch.

136 For Pulp and Paper Mills—Electric power system equipment for pump and paper mills is presented in 16-pp Publication GEA-5521. Illustrated with photos and diagrams, features discussion on types of turbine generators available and points to be considered in selection. Outlines company's power generation and distribution equipment designed for specific mill needs. Lists other bulletins concerning drives for specialized pulp and paper mill purposes. General Electric Co.

MATERIALS HANDLING

137 Belt Conveyor Idlers—Bulletin 51-81, 42 pp, presents latest designs and developments of company's belt conveyor idlers and machinery. Includes general engineering information helpful in designing and specifying belt idler equipment and cross-section drawings of both steel and cast gray iron idler rolls. New data on a return belt training (self aligning) idler is given, together with material on steep-angle troughed belt idlers and troughed belt self-aligning idlers. Information on lubrication material and techniques is provided, also a detailed description of slipper bunker seals, and data on belt conveyor trippers. Correct maintenance procedure is presented. Chain Belt Co.

138 To Prevent Truck Failures—The care and maintenance of industrial trucks is the subject of this 16-pp manual. Contains 51 illustrations of steps to be taken in preventive maintenance. These cover 24 vital points deserving weekly attention and the 27 factors involved in an annual check-up. Baker Industrial Truck Div., The Baker-Raulang Co.

139 For Fast Handling—This bulletin describes and illustrates company's Model 2500 platform truck designed for fast handling and maneuverability, and powered by a 15 hp Wisconsin engine. Capacity of truck is 2000 lb with standard pneumatic tires, 3500 with optional U. S. Innacush tires. Specifications, dimensions given; optional extras listed. Kalamazoo Mfg. Co.

140 To Trim Your Overhead—This little illustrated folder describes manufacturer's Enconveyor, a low cost overhead track conveyor for light to medium loading. Stresses economy of the system, wide application, short vertical dips possible. Shuler Conveyors, Inc.

141 Bucket Carriers — Bulletin HB-551 covers a pivoted bucket carrier for moving wet or dry bulk materials, at speeds

(Continued on page 119)

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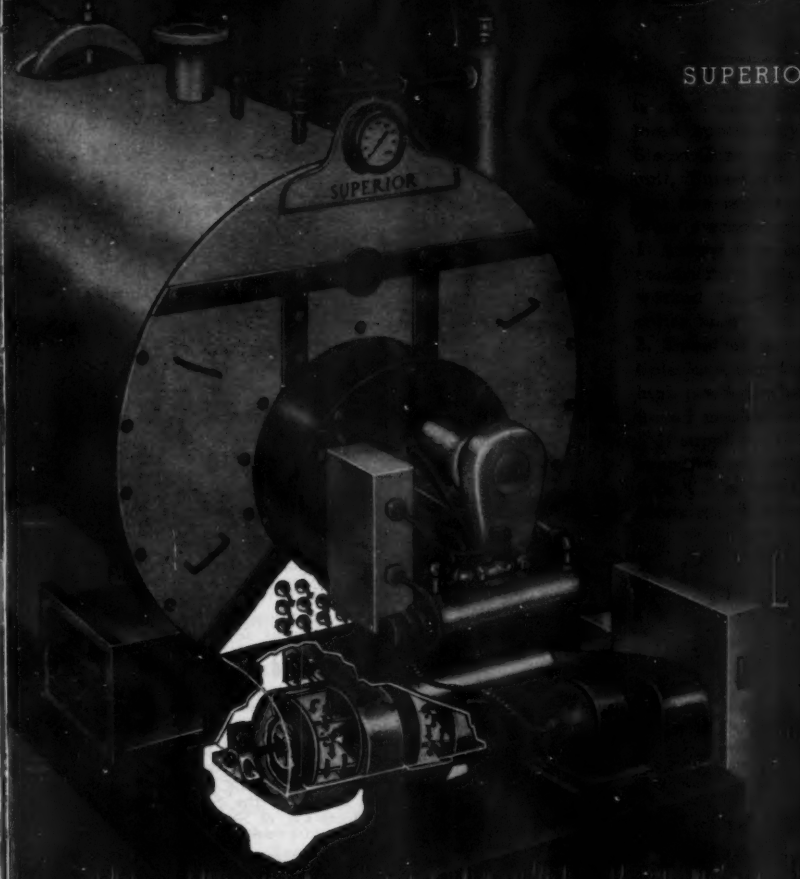

STEAM GENERATORS

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Executive Offices: Three Gateway Center, Pittsburgh, Pa.

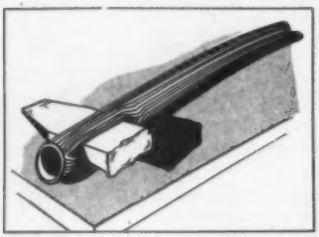
MAINTENANCE & OPERATION

of buildings, utilities and facilities

Improvised Chisel Handle

Contributed by Paul C. Ziemke

By using a short length of rubber hose, say about 15 in. long, you can make a handy cold chisel handle.



Chisel handle made from rubber hose

At one end of the hose, cut a slit through both walls. Insert the chisel bit in slit and you have a handle that does not break or wear away like wood, and does not sting the hands. Be sure to place a ferrule over hose at chisel end to prevent hose from splitting completely.

Versatile Boiler Turns a Nuisance into Dollars

MANY INDUSTRIAL companies have waste gases and vapors which cannot be released directly to the atmosphere without creating a nuisance. The Stan-Cal Asphalt Co., Portland, Oregon, is turning just such a nuisance into dollars by converting its boiler.

The boiler, a 350 hp Erie type VL, has been converted to deodorize a maximum of approximately half a million cubic feet of noxious gas an hour resulting from asphalt production. This is done in the combustion chamber of the boiler before the spent gases are passed into the air. Some of this processed gas runs as high as 1500 F, some as low as 200 F.

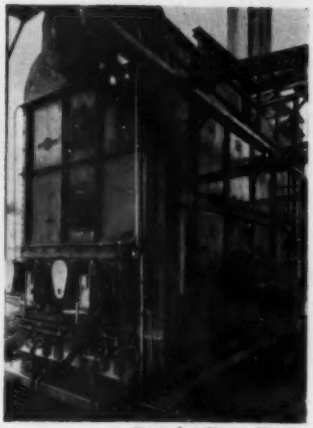


Photo: Iron Fireman Mfg. Co.

Converted boiler deodorizes gases besides its regular job of supplying steam

While deodorizing gases, the boiler is also producing about 10,000 lb of steam per hour, at 160-lb gauge, or about half the steaming capacity when the boiler is not doubling in brass in the deodorizing role.

Further economies come about through the ability to handle the company's own by-products through the same oil burner. These by-products vary from a high acid petroleum with a consistency equivalent to No. 1 fuel oil, to high acid petroleums with a consistency equivalent to No. 6 fuel oil. This entire range of fuels is handled without burner adjustments.

Tool Reduces Time Required to Strip Vinyl Protective Coatings

A TOOL DEVELOPED by Loyd D. Cain, an assembly mechanic, is reducing the time required to strip strippable vinyl protective coatings off B-47 rear fuselage skins by about 70 per cent.

The device consists of a bottle with an air intake and two antenna-like dispensing tubes. The bottle is filled with the protective coating in liquid form and the amount dispensed by the antennae softens the edges of the area to be stripped just long enough to permit the stripping and then hardens to seal the remaining edges of coating.

Photo: Texas Engineering and Manufacturing Co., Inc.

This new tool reduced time required to strip protective coating. It seals edges of stripped area and operates without any possibility of damaging the skin

Cost Reduced on Reclaiming Metal Strips

COST OF reclaiming valuable metal strips from rejected weather stripping has been cut more than 90 per cent after installing a 5-kw induction heater at the Sponge Rubber Products Co. of Shelton, Connecticut.

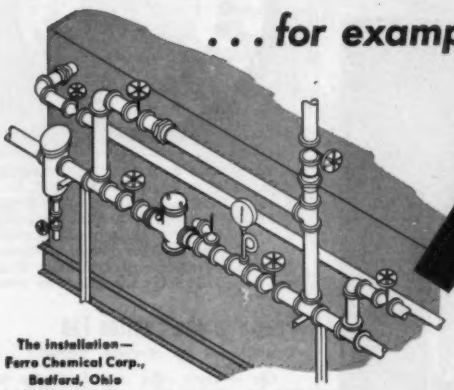
The company, which applies sponge rubber to metal strips to make weather stripping for automobile doors and trunks, found that, because of the difficulty of getting rubber to adhere to metal, 20 to 30 per cent rejects could be expected.

Reclaiming the valuable metal strips from these unsatisfactory pieces was formerly done by soaking the strips in a chemical solvent. After several hours of soaking, the swollen rubber could be peeled off by hand. The solvent used however, was highly inflammable and gave off toxic fumes—both factors requiring constant safeguards.

In the new setup, the rejected

for outstanding service

on Steam to Drying Ovens . . . for example



The installation—
Ferro Chemical Corp.,
Bedford, Ohio

PROBLEM: To maintain automatically, within close limits, uniform reduced steam pressure from supply line to battery of two drying ovens controlled by individual thermostatic valves.

WORKING CONDITIONS: Initial steam pressure of 70 psi to be reduced to 13 psi, and maintained without significant fluctuation whether one, both, or neither of the ovens is being operated.

SOLUTION TO PROBLEM: One No. 960 Crane Brass Pressure Regulator, properly selected for capacity required, and with adequate condensate drainage provided.

RESULT: For more than 5 years, without interruption and with no more than routine maintenance, the Crane No. 960 Regulator has given complete satisfaction. Operating like new, and since all wearing parts are renewable, it will virtually never wear out. User remarks on unusual simplicity of adjustment.

Another typical case history, demonstrating the bigger value and lower ultimate cost of Crane Quality Valves. And why . . . More CRANE VALVES are used than any other make!

. . . Install Dependable Quality CRANE VALVES

No. 960 Crane Brass Pressure Regulator for steam or air. Literature on request through your Crane Branch or Crane Wholesaler.

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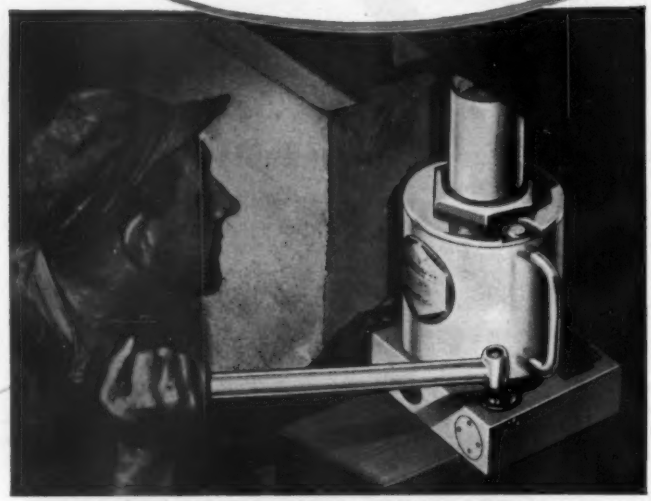
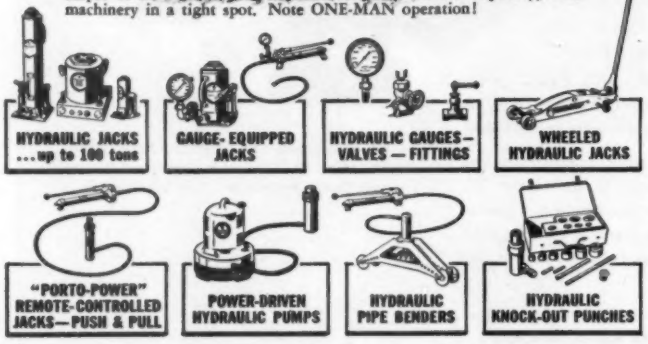
Pick the right jack for the job

...from the world's most complete line of hydraulic equipment



Don't do it the HARD way... do it the HYDRAULIC way! Here's an example of how a compact Blackhawk Jack (50-ton capacity) lifts machinery in a tight spot. Note ONE-MAN operation!



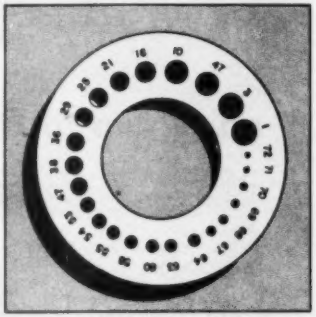
YOU GET ALL THESE HYDRAULIC TOOLS ONLY FROM BLACKHAWK

BLACKHAWK

Save buying time when you need hydraulic equipment. Specific Blackhawk—and be sure you'll get the hydraulic tool that will match your requirements exactly. Order from leading supply houses. Write for free catalogs. Products of Blackhawk Mfg. Co., Dept. J-49101, Milwaukee 1, Wisconsin.

strips are placed on a continuous conveyor belt, pass through an inductor coil connected to a G-E induction heater, and are stripped immediately by a gloved workman. The heater runs six to seven hours a day, processing nearly six thousand strips in that time.

Drill Gauge



A convenient drill size gauge can be made from a large flat brass or iron washer. Drill a hole through the metal with each size of drill and stamp the size alongside the hole with a metal numeral stamp. This gauge is handy for identifying size of drill after number on drill becomes illegible from wear

Puzzle of the Suction Fan

Contributed by Herbert Bouton

On a very cold morning, one of the crew of a large wood working plant threw in the controls of a 60 hp motor which was belt-driving a large suction fan. He was surprised to find the motor barely moving the fan. As the fan had run trouble-free for years, and had been all right the day before, he suspected some form of electrical trouble.

The maintenance department was called in to determine what the trouble might be. A quick check showed that the motor was overloaded. Trouble of a mechanical nature was suspected inside the fan case, but with a tightly closed case and both the suction and discharge pipes tightly attached to it, it was difficult to see how any foreign body could have entered the fan.

The lower part of the case seemed too solid to be normal and a hammer blow test verified this situation up to the suction pipe, while above this point the ring indicated the case was normally empty. There was no opening in the case from which to drain what seemed to be water, so a hole was drilled. Sure enough, out eame plenty of water and as soon as the case drained dry, the fan motor started up and the unit operated as usual.

Further investigation as to the cause revealed that this fan had once operated into a cyclone dust separator up on the roof. It had

Bring them down with these DAYTON Cog-Belt* "teeth"

- 40% more h.p. per belt
- fewer belts
- fewer pulley grooves
- longer belt life

Switch to premium Dayton Cog-Belts and watch the cost of power transmission come tumbling down. Original cost is less. 5 Dayton Cog-Belts do the work of 7 ordinary V-Belts.

You save drive space. Cog-Belts let you use up to 25% shorter center-to-center pulley distances.

Cogs are the *only* V-Belts scientifically built to bend, like your finger. They withstand flexing and compression strains better, run cooler, last longer.

To get shut of V-Belt troubles for the duration, to save money and drive space, give your Dayton Distributor the "high-sign" of better V-Belt power transmission: the arched finger that means Dayton Cog-Belts and important savings!

COGS FIX FLATS!

Dayton Cog-Belts converted a compressor drive in a railroad shop, from a flat drive that averaged 6 breakdowns a year, to a trouble-free V-flat drive now going into its tenth year of service. Cogs need no special pulleys, grip so well they convert flat to V-flat with only one pulley change!

DAYTON RUBBER COMPANY • DAYTON 1, OHIO

V-Belts by **Dayton Rubber**

*T.M.

WORLD'S LARGEST MANUFACTURER OF V-BELTS

Improved

EC&M Line-Arc CONTACTORS

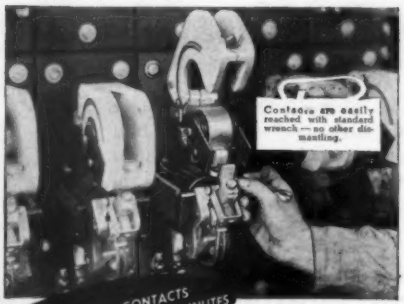
CUT OPERATING COSTS

on Motor Control, Power and Lighting Circuit Switching

NEW magnetic circuit is *unrestricted below the air gap.* Magnetic dust is free to fall.

EC&M LINE-ARC Contactors have been improved with a *new magnetic circuit* and *safer electrical interlocks*. Remaining unchanged are all current-carrying parts and the well-known EC&M LINE-ARC principle, which provides high arc-rupturing ability and long contact life through cool contact operation.

QUICK CONTACT RENEWING, TOO *Encourages* GOOD MAINTENANCE


Contacts are easily reached with standard wrench — no other dismantling.
FRONT AND REAR CONTACTS REPLACED IN LESS THAN 2 MINUTES

The LINE-ARC principle keeps contacts cool. Cool contacts result from quick transfer of the arc to the arcing plate and circular guard over the blowout coil. The LINE-ARC principle causes the arc to leave the contacts quickly—oscillograms show that the arc is transferred in 1-500th of a second.

Write for NEW BULLETIN 1145-D

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79th STREET • CLEVELAND 4, OHIO

since been connected to another collector but the pipe to the first cyclone had been left connected, with a loosely fitting damper to shut off the air between the first cyclone and the fan. The old discharge pipe from the old cyclone led into an inadequately designed dust house, in the false hope that the dust would settle there, and the surrounding neighborhood be spared its nuisance.

Later, someone else put a live steam jet into the dust stream in an effort to make sure the dust settled. Upon the abandonment of this unit, the steam line had not been dismounted, but was still connected to the main down in the boiler room, with the shut off valve closed.

A new fireman had just come on the night before, and was anxious to make good on a large heating job all alone at night. He noticed the closed valve and figured there must be something needing heat on that line and turned it on. The result was that the metal cyclone and pipe up there on the roof had made a dandy condenser, and the condensate had run down through the blower pipe into the fan case.

Although the fireman was warned, the same thing happened the following day. To prevent repetition of this incident, the crew set to work tearing down the abandoned line.

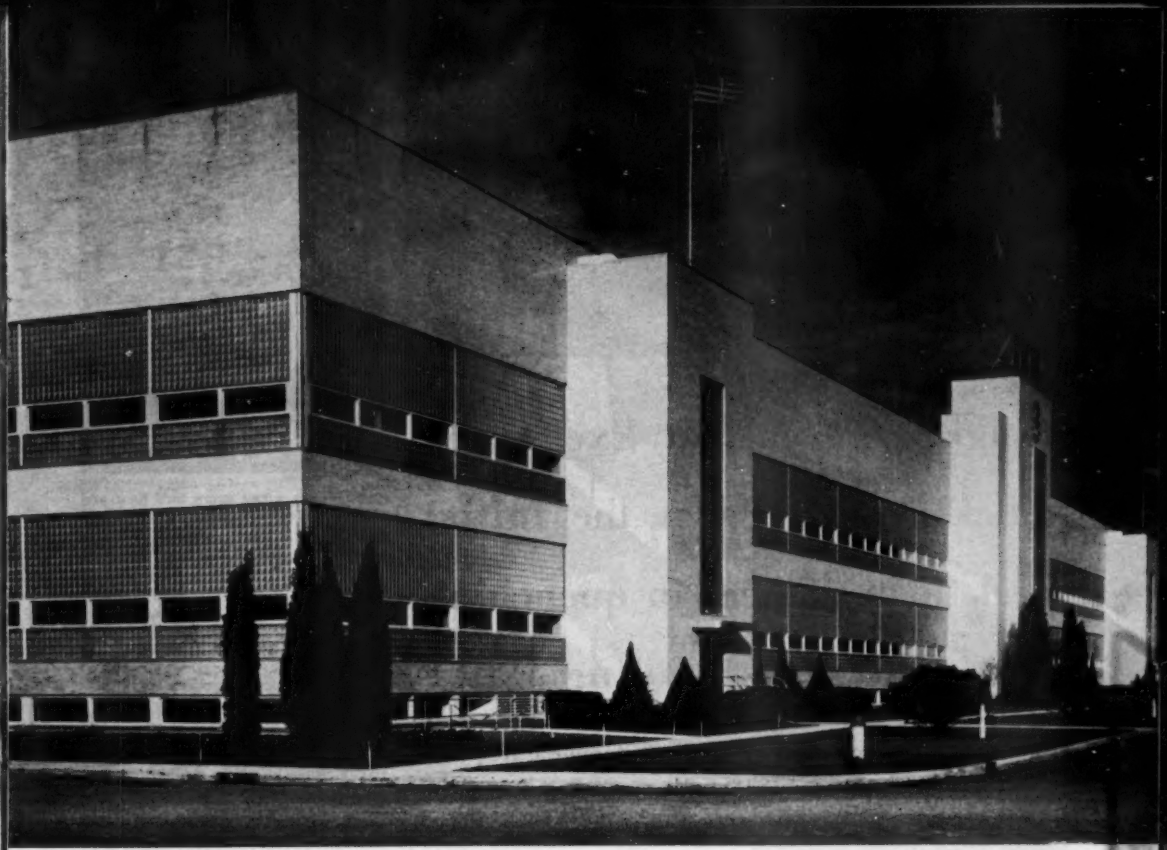
Roof Tile Improves Plant Lighting Conditions

Photo: Owens-Illinois Glass Co.

The Lynch Corp., Anderson, Indiana, recently replaced a worn-out roof deck. The section covered by the new deck, made of roof tile laid on rail-type subpurlins, is 15 deg cooler on hot summer days than the adjoining section covered by wood. The deck also serves as a reflector, improving lighting conditions

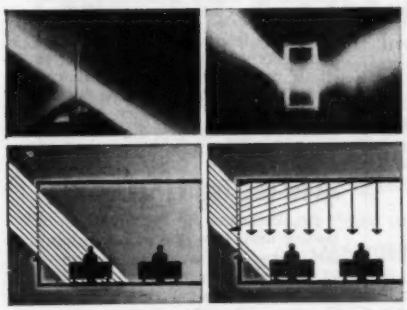
Tube System Speeds Analysis

THE SCOVILL Manufacturing Co., Waterbury, Connecticut, recently installed a 1000 ft long pneumatic tube system between the casting shop and metals research department. This system speeds laboratory analysis of each heat and eliminates



Daylight Engineered – International Business Machines Plant No. 2, Poughkeepsie, New York.
Consulting Engineers: Seelye, Stevenson & Value. Contractor: G. D. Campbell Builders Co., Inc.

HOW TO MAKE DAYLIGHT WORK OVERTIME ...THROUGH Daylight Engineering



Direct sun causes uncomfortable brightness near windows, extreme contrast in other parts of room. Insulux Fenestration (glass block plus vision strip) directs and spreads daylight to ceiling, keeps brightness at comfortable levels, provides vision and ventilation.

You can make free daylight work overtime for you in your building—whether it's still in the planning stage or already built.

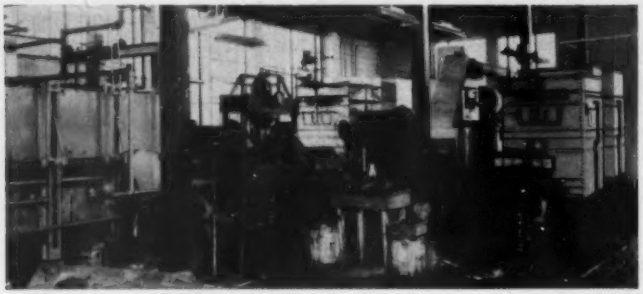
Daylight Engineers can help you create an Insulux Fenestration System that will practically turn your building with the sun all day. It eliminates objectionable glare—morning, noon, or afternoon.

An Insulux Fenestration System will insure privacy with light . . . provide protection against dust, dirt, and prowlers. It is permanent, low in maintenance, sanitary, sound reducing, thermal insulating, and fire resisting.

For detailed information, write: Daylight Engineering Laboratory, Dept. PE10, Box 1035, Toledo 1, Ohio. Insulux Division, American Structural Products Company, subsidiary of Owens-Illinois Glass Company.

INSULUX GLASS BLOCK

INSULUX FENESTRATION SYSTEMS
—by the leaders of Daylight Engineering



Niagara Aero Heat Exchanger quickly pulls down the initial peak load of heat in quenching . . . and saves cooling water

Accurate control of quench bath temperatures and quickly effective capacity to handle the initial peak load of heat in quenching prevents production set-backs, increases the output of your heat treating department, prevents oil fires, saves you losses from rejected parts.

Niagara Aero Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletin #120 giving complete information.

NIAGARA BLOWER COMPANY

Over 35 Years' Service in Industrial Air Engineering

Dept. PE, 405 Lexington Ave. **New York 17, N. Y.**

Experienced District Engineers in all Principal Cities

Photo: Lamson Corp.

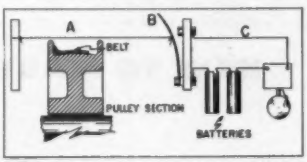
Samples are taken every half hour and sent to research laboratory for analysis

the need for human messengers between the two operations.

Formerly, a messenger was needed on each shift to carry samples and messages back and forth each hour. Now, samples are merely placed in an envelope which is inserted in the carrier and dispatched. From 100 to 200 tube trips are made each day.

Bell Warns of Trouble

THIS SKETCH shows how you can easily make a safety device of your own. An example of its use is shown by the transmission belt which is beginning to climb one of the flanges. The thread (A) holds a brass strip



This safety device detects trouble before it can cause too much damage

(B) away from an electrical contact point. As soon as the belt starts to climb over the edge, it will rub against the thread, breaking it, and the brass strip will then make a closed circuit through the wire (C), which will, in turn, ring the bell.

Six-for-One Testing Laboratory

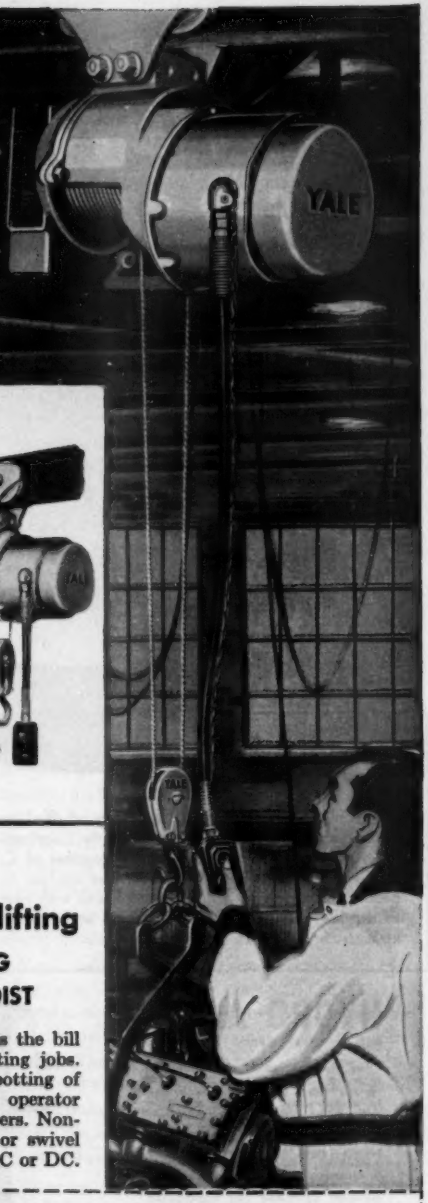
AN INCREASE in the number of testing units one operator can handle is the time-saving advantage of 12 controllers installed in the Research Department of Shell Oil Company's Martinez Refinery, Martinez, California. Each of the 12 instruments has 6 control points, permitting the control of 6 tests at one time by one instrument, with a total of 72 tests when all 12 units are in operation.

The controllers test the use of oils and lubricants in engines ranging in

SPECIFIC PROBLEM . . .

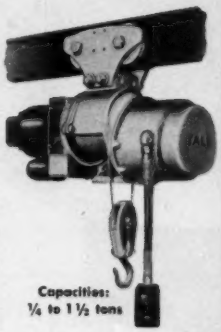
SPECIFIC ANSWER!

YOU'LL GET MORE DONE WITH A HOIST THAT'S EXACTLY RIGHT . . .



. . . for efficient quick-lifting power

YALE LOAD KING ELECTRIC HOIST

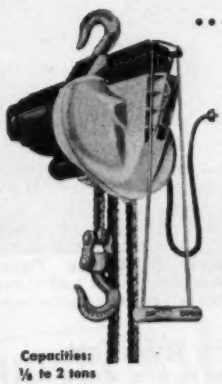


Capacities: ¼ to 1½ tons

Wherever a rugged, moderately priced, light-duty hoist is indicated, this new YALE is a "natural." It can stay on the job 'round the clock, lifting at speeds ranging from 9 to 41 F. P. M.! Push-button provides split-second one-arm control for easy "inching" and spotting of load. Motor and load brakes protect load and operator even when power is off. Available in wire rope or chain models with trolley, lug or swivel hook suspension.

. . . for dependable general-purpose lifting

YALE MIDGET KING ELECTRIC HOIST



Capacities: ⅛ to 2 tons

Here's a YALE money-saver that fills the bill perfectly on a thousand-and-one lifting jobs. Get speedy lifting, fast, accurate spotting of loads. One-hand bar control leaves operator free to guide loads as he lifts or lowers. Non-fracturing steel load hook. Trolley or swivel hook suspension models available, AC or DC.

and there are many more!

A YALE HOIST FOR EVERY JOB

Get all the facts today! ➡

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Please show me how I can step up production with YALE hoists.

_____ Please have your local representative call on me.

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Company _____

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YALE MATERIALS HANDLING EQUIPMENT

THE YALE & TOWNE MANUFACTURING COMPANY

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Your Most Appreciated Servants

PETRO

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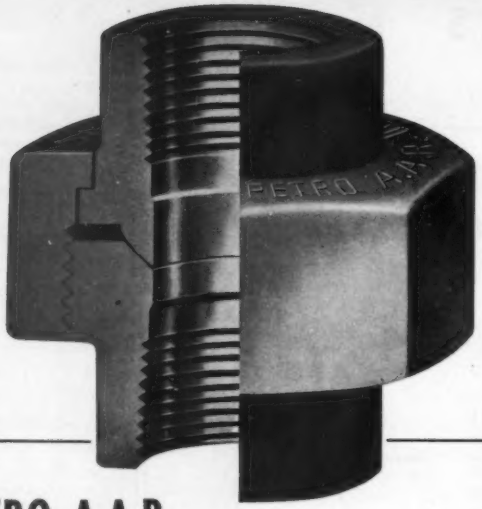
FORGED STEEL UNIONS



PETRO A.A.R.

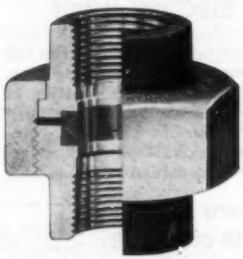
REG. U. S. PAT. OFF.

One of the unusual features of this appreciated Union is the Permanently Lubricated Nut Threads. The nut threads are plated by Udylite process of Cadmium. This special plating forms a ferrous to non-ferrous contact in the nut threads that permit the pipefitter to make and break with ease, regardless of length of service, eliminating wrench abuse and brute force in taking unions apart.

HYDRO A.A.R.

REG. U. S. PAT. OFF.

The Hydro Union is made from the same forgings and same dimensions as the Petro Union. It has bronze to bronze seats machined and cold rolled. The cold-rolling approximately doubles the Brinnell hardness of the bronze. The bronze seats are completely fused to the steel by a new method of brazing. The Hydro Union is recommended for all services that will not affect bronze. It has permanently lubricated and rust-proofed nut threads.



Write Dept. N. for illustrated catalog or refer to listings in Composite Catalog pages 3140-3141, Refinery Catalog page 538, and Chemical Engineering Catalog pages 980-981.

ORDER BY TRADE NAME FROM YOUR LOCAL SUPPLY STORE

PIONEERS OF STEEL UNIONS SINCE 1912

CLAYTON MARK & COMPANY

1900 DEMPSTER STREET • EVANSTON, ILLINOIS

size from one cylinder to the largest motors of trucks and tractors. Ten units are used on engine test stands for controlling the flow of additional cooling water or steam in engine

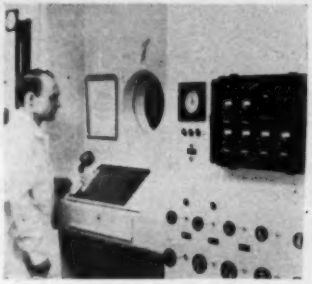


Photo: Taylshue Instruments Div.

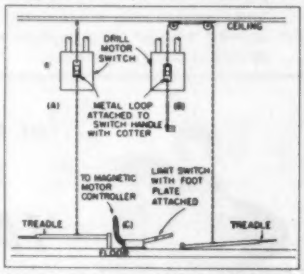
Research technician checks controller used for testing fuels and lubricants

jackets, oil heat exchangers, fuel heat exchangers, and comparable equipment. Two are used with bearing test machines for controlling electric heaters which maintain desired temperatures.

Foot Control for Drill Press Switch

BY CONSTRUCTING a simple treadle and utilizing some sash chain, springs and pulleys, a convenient foot control can be arranged for a drill press.

Figures A and B show two different hook-ups for connecting the foot control. In both figures the treadle is in up position and the motor switch is in "off" position. Figure C shows how this type of control can be used for a magnetic motor controller.



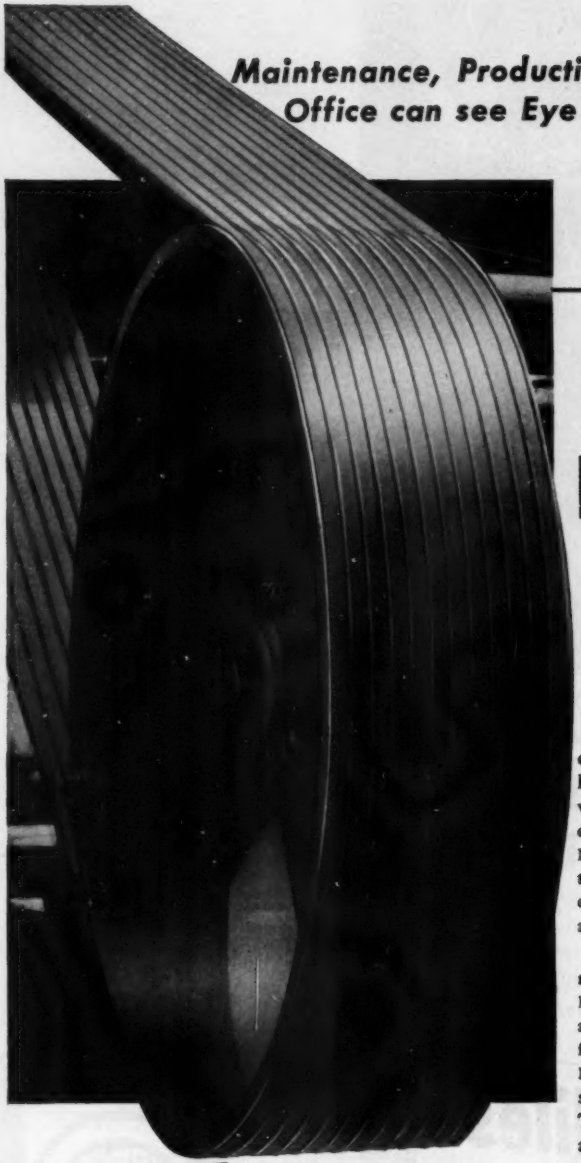
Foot control leaves both hands free to feed drill and cutting lubricant to job

For Holding Screws Tight

Contributed by W. E. Warner

HERE IS A HELPFUL idea to prevent screws loosening in wood or to tighten loose screws. First, insert the screw but do not tighten it completely. Then, withdraw the screw and with a hacksaw cut a slit in the bottom about ¼ in. deep. In this slit, place a small wedge about ¼ in. long, widening at the end to slightly wider than the slit. The screw is

Maintenance, Production, Purchasing and Front Office can see Eye to Eye on this "Baby"



It's a TOUGH, LONGER-LASTING BULL DOG V-BELT!

Yes, a Bull Dog V-Belt has something for everybody. Your engineers and production heads who have enough on their minds already with shortages and the necessity for increased output will appreciate the SPECIALLY ENGINEERED BWH CORD SECTION and its high tensile strength. They'll get the superior load carrying capacity from BULL DOGS and the ability to absorb shock loads that's needed.

Your maintenance men (engineers, too) will note the QUALITY CONTROLLED COMPOUNDS developed by BWH which run cooler and do not crack or deteriorate under severe flexing. They'll probably note also the MINIMUM STRETCH — due to a new and exclusive technique in processing Bull Dog Cords. They'll be *sure* to note the less slippage, fewer adjustments, longer belt life that results.

Your maintenance men will also okay the Bull Dog V-Belt's DURABLE COVERS. They're made of closely woven, heavy, bias-cut fabric that takes the torturous wearing action where the belt meets the sheave — seals it against the penetration of dirt, grease and moisture.

With it all adding up to less money *out* in belt repairs and replacements and more money *in* from maintained and increased production . . . don't you think Purchasing and the Front Office will be glad to go along?

BWH
DEPENDABLE RUGGEDNESS

TOUGH PROBLEMS INVITED!
Ask us or your nearest BWH distributor about your power transmission belting, conveyor belting or hose problems. We're specialists in making mechanical rubber products work better, longer.

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BOSTON WOVEN HOSE & RUBBER CO.

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1. Cab-operated monorail hoists serve single bays or entire plants—from yards or unloading areas—without rehandling.

2. They operate "thru-the-air"—conserving floor space. Never interfere with production on the floor.

3. A wide range of trolley travel and hoisting speeds are available for adapting these machines to production requirements.

4. Operator always in the most favorable position for accurate spotting and stacking.

Shepard Niles specialists will study your operations—show you where and how you can speed up material handling with cab-operated monorail hoist service, and how you can save time and money while doing it. Write for additional information.

Shepard Niles

CRANE & HOIST CORPORATION

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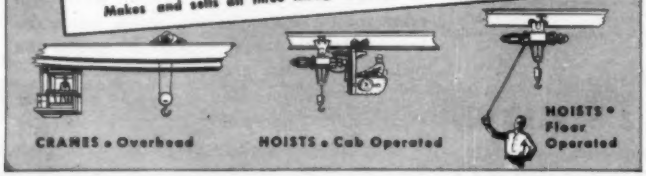
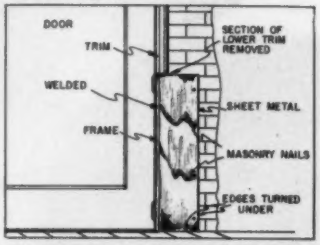


474 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

then placed in the hole again and tightened. As it is tightened, the wedge will be forced upwards, opening the slit and forcing the bottom threads into the wood.

Protecting Door Frames



To eliminate the danger of damaging metal door frames and trim, attach heavy gauge steel sheets, 12 in. wide by 4 ft long, to the wall on each side of door frames. Weld one edge to frame

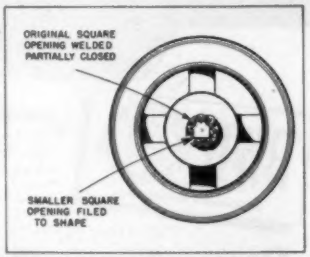
Safety Bulletin Board

Contributed by Fred G. Hess, Asst. Plant Engr., Camden Forge Co.

Pertinent messages and posters are displayed on our outdoor bulletin board as constant reminders to the workers that safe practices save life and limb

Use Hand Wheel as Valve Key

A SMALL HAND wheel from a worn out valve will prove more convenient for opening and closing gas tank valves than a wrench. If the square opening in the valve wheel is too large to properly fit the valve stem, weld it partially closed and file the opening to correct size to provide a sufficiently tight fit.



Hand wheel proves useful as valve key

NEW WRINKLE IN GLAZING CUTS COSTS

Sixteen-foot openings in the sidewalls of this building at Midvale Steel Company's Nicetown (Pa.) plant are glazed with corrugated PLEXIGLAS—four 48" x 72" sheets per opening. No steel sash is needed. PLEXIGLAS corrugations match those of the corrugated iron sheeting and economical mounting is achieved by the use of 20-gage sheet iron flashing at top and bottom of windows. Added advantages: Better lighting and better appearance.

PLEXIGLAS Sashless Glazing Ends Window Worries

"How can we improve daylighting without sky-rocketing costs? How can we stop excessive window breakage?" PLEXIGLAS answered these questions for Midvale Steel Company. Tough, shatter-resistant translucent PLEXIGLAS *panels* were installed without sash, and diffused daylight made the building interior even lighter than when window spaces were left entirely open!

Wherever there's a lighting—or breakage—problem, install PLEXIGLAS acrylic plastic. It resists hard blows. Light weight lets you install it easily, safely. And because translucent PLEXIGLAS efficiently diffuses light, you get full, even illumination.

In industrial plants, schools, housing projects and prefabricated buildings, PLEXIGLAS pays for itself in replacement-and-maintenance economies. We'll be glad to send you full information. Write today for complete details about PLEXIGLAS for glazing.

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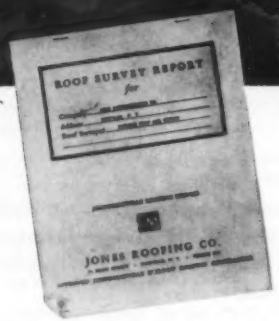
THESE MEN are making a "Roof Survey Report." Ask about this free service . . .



The Built-Up Roof Survey tells exactly what condition your roof is in, gives you a permanent record, helps you plan ahead for roofing maintenance. Yours for the asking!

TAKE ADVANTAGE of this *free* Johns-Manville service to find out the exact condition of your built-up roof. It will enable you to make plans *now* for repairs and maintenance in the future.

That's what plant engineers and maintenance executives *like* about the J-M Roof Survey Plan.

Don't take *your* roof for granted, even though it doesn't *seem* to be leaking. Many a roof with torn flashings, dried-out felts, even rotted decks has been *assumed* to be in "good condition." The Roof Survey Report will cover all the critical areas . . . flashings, deck, roofing felts, parapet walls, skylights, etc. It will be an accurate picture by a roofing *expert*—the J-M Approved Built-Up Roofing Contractor. And it will cost you only the trouble of *asking* for it.

Let us send you the interesting booklet, "Things You Should Know About Your Roof." It gives complete information about the *free* J-M Roof Survey Plan, together with the full story of the J-M Flexstone* Asbestos Roof and the Asbestile* Flashing System. Write Johns-Manville, Box 158, New York 16, N. Y.

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Please have one of your Approved Built-Up Roofing Contractors see us about making a free survey of our roof.

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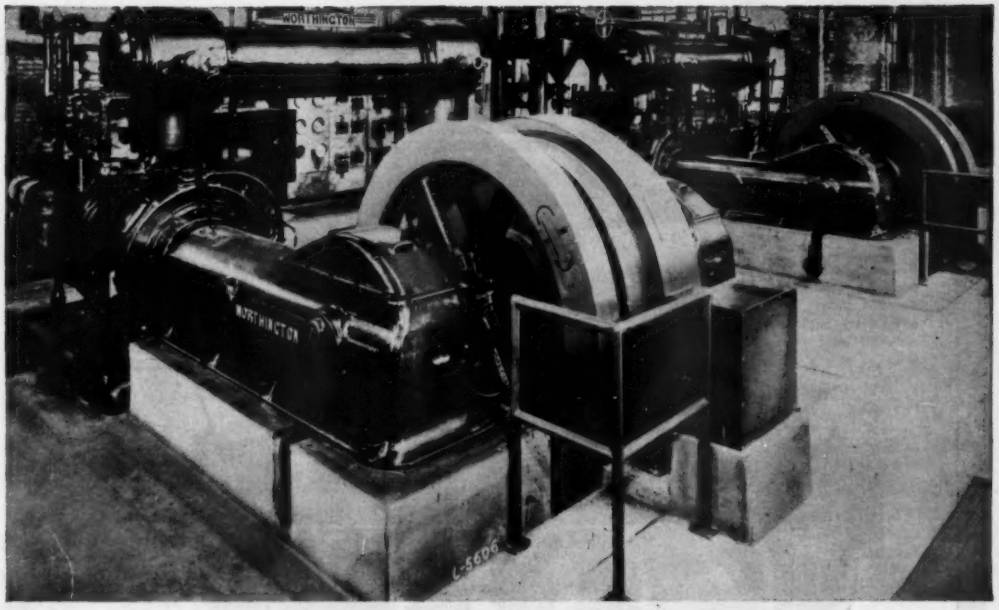

Link-Belt "Hooks Up" with Worthington Air

You can't find a compressed air need that Worthington can't fill.

This installation pictured above is a Worthington DC2 air compressor in Link-Belt Company's Pershing Road plant in Chicago. And that picture could be duplicated all over America where engineering-wise plants insist upon dependable, trouble-free, low-cost air.

One reason is—*only* Worthington makes air compressors with the Feather* Valve. Any other valve is complicated beside this Worthington exclusive. Feather* Valve is the simplest, lightest, most efficient ever made.

Then there's Worthington automatic variable capacity control—acknowledged the most accurate, flexible and simple control obtainable. And Worthington's high-efficiency intercooler that needs less water, less power, less attention.

Build around these features with sturdy construction . . . back up the machinery with Worthington application engineering—and you have plenty of reasons for deciding *there's more worth in Worthington*. Worthington makes all auxiliary equipment, too. Write for bulletin L675 B-1B to Worthington Pump and Machinery Corporation, Compressor Division, Buffalo, N. Y.

WORTHINGTON

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K1.9

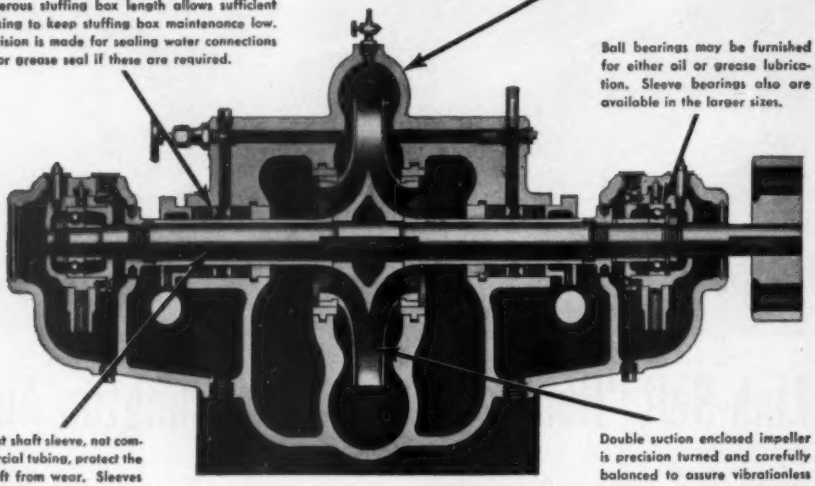
NO OTHER COMPRESSOR WILL OUTPERFORM A WORTHINGTON

ALLIS-CHALMERS Double Suction PUMPS

Standard and special materials available for many types of service. Iron, bronze, stainless steel and combinations of these materials handle both acid and alkaline solutions.

Heavy, horizontally-split cast-iron casing construction with suction and discharge nozzles located in lower half for easy inspection without disturbing piping.

Generous stuffing box length allows sufficient packing to keep stuffing box maintenance low. Provision is made for sealing water connections or for grease seal if these are required.



Ball bearings may be furnished for either oil or grease lubrication. Sleeve bearings also are available in the larger sizes.

Cast shaft sleeve, not commercial tubing, protect the shaft from wear. Sleeves extend through the stuffing box and seal at the impeller hub.

Standard sizes range from 10 to 7000 gpm with heads as high as 475 feet. Larger sizes are available.

Double suction enclosed impeller is precision turned and carefully balanced to assure vibrationless operation and close wearing ring clearance. Water passages are hand finished to a smooth surface.

Built for LOW MAINTENANCE

GENEROUS CONSTRUCTION is a term you'll often hear describing Allis-Chalmers double suction pumps. That is because these pumps are built with the extra metal thicknesses, extra strong parts, extra construction features and extra careful workmanship that means lower pumping costs for you.

Every Allis-Chalmers double suction pump is carefully tested on the most modern pump testing equipment in the industry. Each installation is individually engineered by men with experience in thousands of pump installations to give you exactly the right pump for your needs.

Allis-Chalmers can take full responsibility for your pumping operation because Allis-Chalmers can furnish the complete installation—pump, motor, drive and control—all built of coordinated design by one manufacturer. Efficient operation is assured and installation problems are reduced.

Whatever your pumping problem, call the nearest Allis-Chalmers Authorized Dealer or Sales Office or write Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 08B6146. A-3266

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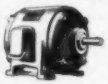

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CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

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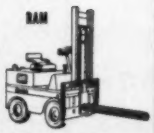
The Buda Company, Harvey, Illinois



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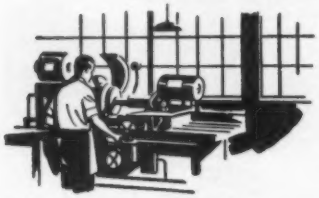
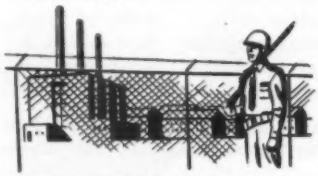


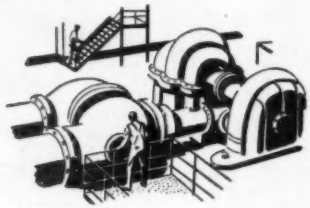
FOR MILLING, GRINDING...

Dust from grinding machine operations created a problem in the plant of a major steel file manufacturer. Then, several American Blower Type E Industrial Fans were installed. Now, the plant is cleaner, safer, and working conditions more pleasant. Type E Fans are specially designed to remove shavings, sawdust, dust from grinding and buffing, to convey material, remove smoke and fumes, and for many other applications. Can American Blower products help you?



MORE EFFICIENT POWER...

American Blower Induced Draft Fans play an essential part in the operation of a new military air station power plant. High static efficiency, low RPM, low tip speed and low inlet velocity are important operating characteristics of these dependable fans. In military or civilian installations, American Blower equipment meets the most exacting power plant requirements. If you are enlarging or expanding your facilities, consult us.



BETTER PUMPING...

A large midwestern city recently invested in an American Blower Gyrol Fluid Drive for one of its municipal water supply pumps. After two months the average power requirements dropped from 932 kilowatt hours per million gallons of water to 718 kilowatt hours—a reduction of 23%. After the first year the increased power savings and added flexibility of control justified the addition of a second fluid drive on a larger unit. Could *you* save with Gyrol Fluid Drives?

If you're faced with changing from civilian to military production, let American Blower supply you with the air handling products that improve comfort and efficiency in business. For full data on American Blower heating, cooling, drying, air conditioning and air handling equipment, phone or write our nearest branch office.

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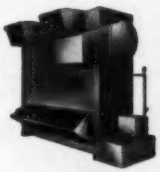
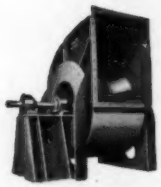
Ventura Fans



Air Conditioning Equipment



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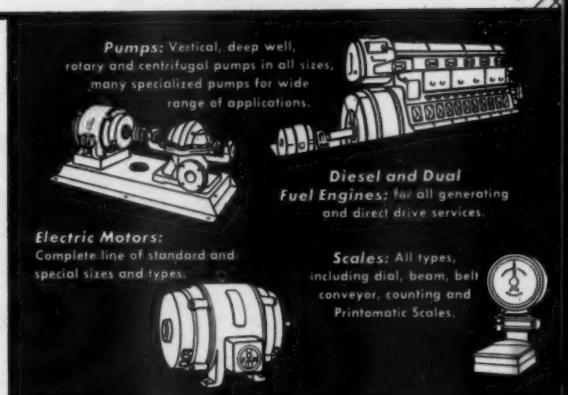
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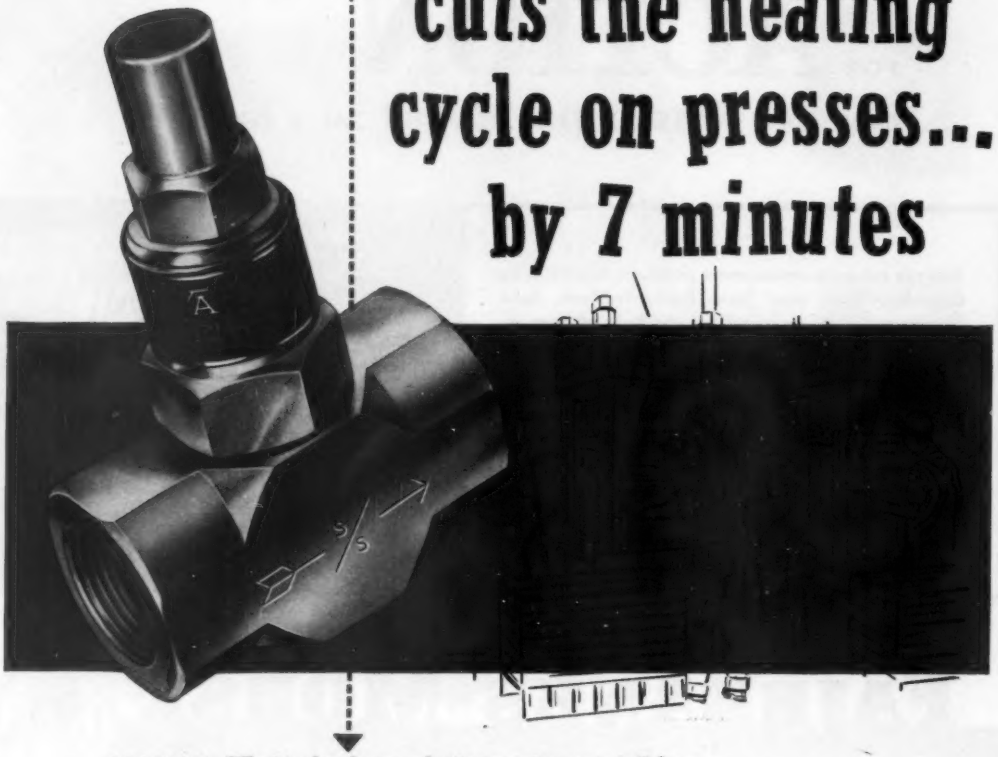

PROBLEM: What to do when production requirements call for a speed-up in the heating cycle.

SOLUTION: (A typical one supplied by a western molded-rubber plant) Equip presses with Yarway Impulse Steam Traps.

RESULT: Heating cycle now 8 minutes instead of their usual 15, a saving of nearly 50%.

Yarway Impulse Steam Traps are designed **to get equipment hotter, sooner, and keep it hot**—thereby increasing production. In operation, Yarways send the most premium B.T.U.'s at top temperatures into your product or process.

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UNCLE SAM SUGGESTS A CHANGE

FOR THE NEXT few months I will be in uniform on a special assignment with the Air Force. This is the third time in 34 yr that I have had to put civies in mothballs, and, almost four years to a day that I reported to the separation center to call an end to World War II.

For the first time in these four years I beg the indulgence of readers of PLANT ENGINEERING on a point of editorial privilege, a page of space for a personal message. In military circles RHIP, Rank Hath Its Privileges, is a common expression well known to all veterans. In publishing it is still RHIP but with a different meaning, Readers Have Immediate Priority. I trust no reader will stand on rank and begrudge me this space because, these four short years have meant much to me. With your assistance and after long planning they have brought to fruition a magazine by and for plant engineers.

As a publication, we did not create the profession that has done so much for American industry. Over the years, that profession developed the hard way, unheralded and unsung. It forged its own destiny. For the first time in history, however, the magazine PLANT ENGINEERING gave voice to that profession. As a result that profession is now receiving just recognition, whereas prior to 1948 it was unrecognized outside of the immediate plant.

Today industry and business recognize the plant engineer as a dominant factor in industry. Educational institutions also recognize this fact and are starting training courses. Belatedly they realize that this is an exceptional outlet for their more promising graduates, the ones who can meet the exacting needs of this profession. The requirements are rugged and only those with special qualifications can make the grade in a profession where tact, ingenuity, versatility, a dislike of routine work, and a rugged constitution are prerequisites.

To those who have the abilities the profession offers much. If it did not why would a plant engineer remain a plant engineer at heart regardless of his title even up to that of Chairman-of-the-Board? Who besides the plant engineer knows more about the entire operation, the details of organization, has the experience of administration and is better qualified for promotion?

As to PLANT ENGINEERING, the record speaks for itself. With the active support of the profession we have increased in size nearly 100 per cent per year. As time goes on we will continue to warrant your support. With this in mind, may I close on a message written just a decade ago at the start of World War II:

"It is with a heavy heart that I sit down to fill this column for the last time. . . . During normal times it is easy to forget that what we have, and what we are, is partially due to individual effort and partially due to the economic system under which we live. For the opportunity provided, we all owe a debt to society—a debt which falls due when the Nation is endangered. This debt must be paid if the heritage of freedom and opportunity for which past generations fought and died is to be handed down to posterity. . . .

"Measured in worldly goods my debt is small but measured in experience and satisfaction it is huge. As a soldier in the last war, as an engineer ashore and at sea, and, of recent years as an editor, I have seen a good bit of the world. . . . The good has been generously sprinkled with the bad but in retrospect it all fits into a mosaic which I cherish and would not want changed.

"No part of that mosaic stands out brighter than the periods I have edited this paper. Any editor's acquaintance must be wide and his correspondence heavy, but the more personal basis of editing this new paper has developed an almost unbelievable amount of correspondence from hundreds of engineers in all parts of the world. This is an unending source of satisfaction to the editor, equalled only by the knowledge that it will be carried on by others just as capable. . . .

"Of necessity I must take this means of saying farewell, with best wishes to all, and a deep sense of gratitude to the many who have helped to make" industry and business conscious of the plant engineer and his part in America's heritage.

Richard H. Morris

THE SPECTROSCOPE—
Need One for a Lube Oil Sleuth?

They aren't cheap, and their use calls for carefully controlled conditions, but one railroad figures it is saving at least $35,000 annually on maintenance by use of these industrial Sherlock Holmeses . . . Careful comparison of spectrographs enables the lab men to tell where undue wear is taking place in the machine, can direct repairs accurately

HOW GOOD a detective is the spectroscope when it comes to running down engine troubles? Ever since spectrographic analysis was introduced, and especially since its widespread use in metal and fuel-lube oil analysis, many a plant engineer has wondered: Will the spectroscope prove itself a practical tool of preventive maintenance?

The spectroscope's practicability as far as the "average" plant is concerned, is still a question mark—mainly because of the instrument's cost (about $5000) and also because of the need for controlled operational conditions. However, recent adaptation of the spectroscope as an important instrument of preventive maintenance by several major railroads is a first step in introducing it into industrial plants.

A major oil company, furthermore, reports that it is convinced that the spectroscope can become a plant engineer's trouble shooter—assuring consistent diagnoses of internal engine failures.

Basically, spectrographic analysis as a trouble shooter has to date been found most successful in engine lube-oil examination. A sample of diesel lube oil is analyzed for its spectrum. Suppose that normal, new lube oil ordinarily contains but 4 parts lead per million upon examination of its spectrum.

But suppose that spectrographic analysis of lube oil from an engine under observation indicated the presence of 100 parts of lead to the million. Obviously this high lead count is a product of engine wear. If only one engine part is made from lead, lab men can spot the trouble immediately. But the job grows more difficult when several engine components, any of which could be at fault, contain lead. This requires closer correlation—and common sense on the part of lab technicians.

Southern Pacific Railroad, which is one of several U. S. roads presently gearing its preventive maintenance to spectrographic analysis, often comes face to face with the problem of determining which of several engine components are at fault—arriving at its conclusion without tearing the engine down. Suppose that chromium is indicated by the spectrum of a locomotive's diesel lube oil. Normal lube oil, as used by S.P., contains no chromium. The chromium line in the spectrograph is indicative of either or both of two troubles: cylinder liner wear, because some cylinders are chromium-plated; or engine cooling water leak, because the railroad adds a corrosion inhibitor, sodium chromate, to engine cooling water.

Which component is at fault? Cylinders or engine water piping? Lab men merely scan the lube oil's spectrum further. If there is no spectrum line indicating sodium, which would be present along with chromium if a water leak were the trouble, then the fault is almost positively placed upon the cylinder liners.

Using the spectrum of lube oil as an indication of motor trouble demands: 1—controlled conditions; 2—an accurate spectrum analysis of each engine over a fairly long period of time. Southern Pacific's use of the spectrograph in routine preventive maintenance is typical.

Lab men take lube-oil samples every 10,000 miles of an engine's life. Every month 200 samples are analyzed. A careful record is kept of the elements in the oil as indicated by a spectrum of the sample. To get an accurate spectrum, Southern Pacific uses a modified spectrograph-densitometer ash analysis technique. A 2 gram sample of oil is heated in a porcelain crucible, with 200 miligrams of spectrographically-pure lithium carbonate, driving off volatile hydrocarbons.

Ash residue is then heated in a muffle furnace at 1000 F for half an hour. The ash is then placed in electrodes and "fired." Light, the product of burning, enters a series of lenses where its wave lengths are separated by a grating, and these recorded on film. The film, once developed (a 2-minute job in the lab, using quick-developers, quick-fixing), is projected on a screen, and compared with a "standard" spectrum, also recorded on film. The density of the sample spectrum lines, compared with the "standard's" is an indication of the lube oil's contents.

Specifically, Southern Pacific lab men are looking for abnormal indications of: calcium, chromium, lead, tin, zinc, phosphorus, silver and other elements, like iron and copper.

There are many variables, which must be taken into consideration: First: constituents of the lube oil itself may change from one purchase to the next. Solution: S. P. buys oil from a company whose product is held rigidly constant. However, each new batch of lube oil which goes into engines must be analyzed to determine if any new elements are present.

Second: some engines inherently seem to have a higher level of some elements, which while not normal, do not necessarily indicate

trouble. Solution: spectrums of oil from each engine are kept separate.

Each engine is treated as a separate problem, and each engine's level of certain elements is noted. Third: manufacturers at times use different elements in parts. These usually show up when the engine is first put into service. If spectrographic analysis is going to do real detective work, the chemical properties of each engine part must be known.

Southern Pacific lab men, who know their engines well, have found that certain spectrum indications mean definite troubles:

Normal silver indication in lube oil is 6 parts per million. If 30-60 parts show up on spectrum, it's an almost definite indication of high-temperature corrosion of silver wrist pin bushings, because no other engine part contains silver.

Indication of lead probably means lead flashings on main and connecting rod bearings are out, because no other parts are lead.

Heavy indications of silicon probably means engine air filters aren't working properly because silicon dioxide or quartz is the abrasive element in dirt and sand. For a plant engineer with stationary internal combustion engines, the silicon level would be constant, and heavy silicon would indicate filter trouble. But the determination of harmful silicon content is more difficult for a railroad because over long runs the engine may pass through extremely dusty areas.

Thus, S. P. engines on the desert runs show consistently high silicon spectrum lines—which are considered normal when the engine's run is taken into consideration.

These are but a few of the easier indications—about which there is little doubt of origin. But for many another indication, there is no clear-cut cause of trouble.

Copper, for instance, is one of these trouble-makers. Says an S. P. lab man, "About copper we know a lot—and we know nothing." High density of the copper line on the spectrum could mean any one of these faults in the diesel engines now used by Southern Pacific: One: copper thrust washer in pistons, a serious trouble; Two: copper-lead bearing wear; Three: spacers wearing in the auxiliary gears; or, Four: the presence of a great amount of copper may indicate only copper dust from the main generators.

Slowly but surely, S. P. lab men are finding a positive solution but tracking down of the guilty component is long and tedious. Thus, microscopic analysis of the lube oil sample may indicate whether the copper is in flake form or if it is chemically combined with the oil. Flakes indicate copper dust from main generators—a normal occurence. When copper is chemically combined with the lube oil, it indicates wear.

Iron is another toughy because 90 per cent of the engine is made of that metal. However, the abnormal presence of iron can, with further analysis, point out a guilty component. This is achieved by searching for various alloys. Liners and cylinder heads are made from a molybdenum alloy; connecting rods from a chromium alloy.

These indications and what they may or may not mean, have been cited because the spectrograph is in daily, practical use on many a U. S. railroad. Spectrographic sleuthing is not confined to the lab as an abstract, purely chemical analysis—which is an old spectrographic story. Instead, spectrographic analysis, as described here, is a daily preventive maintenance tool. It's a tool which will likely find increasing use in plants across the nation.

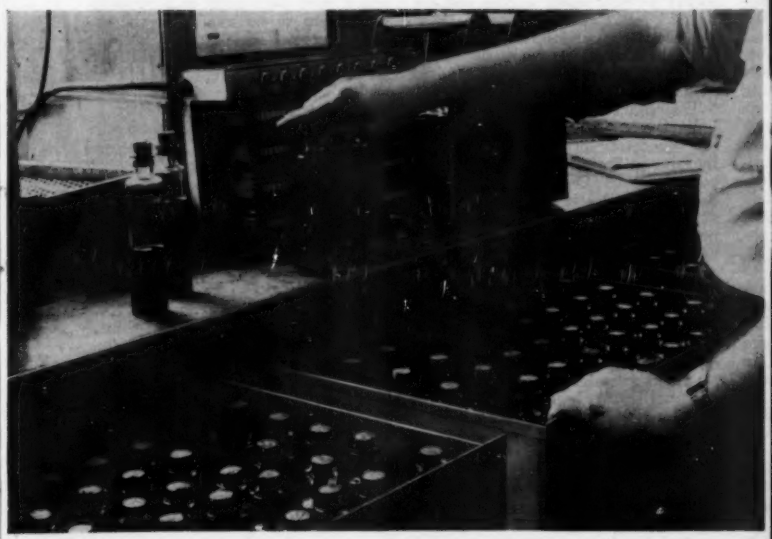
On several recent occasions, Southern Pacific's spectrograph has spotted telltale elements which led to an internal engine trouble. In almost a dozen cases the railroad has saved itself a road failure—which cost anywhere from $10,000 to $20,000.

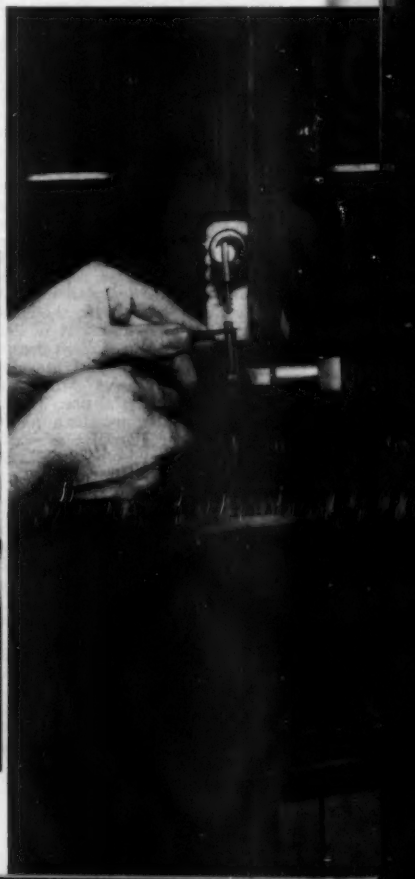
What is the future of spectrographic analysis in U. S. plants? The men who've been using it daily as a practical tool think plant engineers will be turning increasingly to the spectroscope as a key to plant machine maintenance.

Left: Workman takes samples of lube oil from locomotive diesel engine

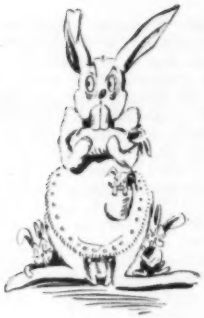
Right: Sample of used lube oil which is under test is fired in this electrode

Below: Samples of oil labeled and ready for spectrograph analysis





What's the Best Way to REPRODUCE IT?



There is one best way to reproduce all drawings, specifications, orders or other printed forms depending on number wanted, purpose for which wanted, length of life expected for the reproduction . . . Amount of work done regularly, size of plant and amount of capital expenditure allowable also enter into the picture . . . At any rate, here is a table that will help you calculate just which way is the best way for your organization

By JOHN B. BENNET

"GIVE TO ME IN WRITING"—In industry and business today a definite need exists to put everything in writing. It is far better to rely on more than verbal communications. As a result of this trend, an increasing need exists for good distribution of written and printed material. There is no justification for mistakes, losses or misunderstandings caused by the inadequate dissemination of information. The manager of a modern plant, therefore, often has to give a good deal of thought to reproducing written material quickly, economically, and efficiently.

In every plant, management sooner or later runs up against problems involving the reproduction of some kind of printed matter. Unfortunately, very little expert information is generally available to the plant manager who is suddenly called upon to find the best way of running off printed copies of some drawing, bulletin or report. There seems to be a peculiar lack of comparative data, highlighting the advantages and disadvantages of the different processes of reproduction.

This article is designed to enable the reader to find readily the cheapest and most efficient way of doing a particular printing job. It presents the results of a study of the major duplicating processes which are suitable for industrial use. The accompanying table permits a qualitative as well as quantitative evaluation of the different duplicating methods according to thirty operating criteria.

The figures given in this table to describe costs and performance attended by the different processes are based on the assumption that average conditions apply. In some cases it will, of course, be possible to achieve better results or lower costs by employing special skill or special equipment. But such results would not be typical and therefore are not widely applicable.

Some readers will find this chart a helpful guide when reviewing existing plant facilities. Other readers will have occasion to refer to it when they decide on the installation of new or additional facilties. Finally, there will undoubtedly be cases requiring the reproduction of material never before handled by the plant; a quick look at the chart will tell how the job should be done.

By using this chart, the first step is to establish the specific printing and reproduction requirements for each plant. This means that the plant engineer or his assistant should tie down such variables as the volume of material to be reproduced over a given period of time. the specific type of work needed, the space and personnel available for this work, etc.

In doing this, the plant engineer will have to answer such questions as: "Do I want extent the legibility of copy?"; "How much money can I spend on this printing job?"; "How fast will we need the reproduced copies?"; "Will there be enough work so that we can afford a special operator for reproduction equipment?"; "How many copies will we need?"; etc. The answers to these and similar questions will establish the relative importance of the thirty one criteria listed in the first vertical column of the chart.

The chart is laid out so that it indicates to what extent the thirty-one operating criteria are satisfied by the different processes under consideration. Once the reader has determined the relative importance of each criterion, he can pick the process that will best satisfy his most important requirements.

The following example will illustrate how this procedure works. Taking the case of a plant without printing equipment, where it is becoming necessary to prepare frequent reports. These reports are intended for high company officials and will also be submitted to a number of customers. These reports usually consist of several pages of text, a few figures and photographs. Before deciding on the most suitable method of reproduction a brief analysis should be made, and the following requirements can then be established as a result of this analysis.

1. Fine appearance and excellent legibility are important since the reports go out to customers.

2. Copies are needed a few days after the report has been written in order to keep company executives informed of the work being accomplished.

3. Costs should be kept as reasonable as possible, but high quality of copy is still more important.

4. The original copy prepared by the engineering office is typewritten and contains line drawings as well as photographs.

5 Many similar reports are expected; the report writing job will be fairly continuous.

6. About one hundred copies of each report will be needed.

The above requirements indicate that the criteria of "Legibility," "Appearance," "Running Speed," "Line Work" point to the use of the Direct Image Offset Method. Since space and personnel and supervision seem to be available, the installation of a small offset press is recommended for this sample case. In addition to the reports, bulletins and office forms can also be reproduced by this press at low cost.

Photographs which might require reduction in size should be printed by the photo offset process since it is the only method that will yield clear copies (see line 10). This work should probably be farmed out to a commercial printing firm since more elaborate equipment is required (see line 31).

The above example illustrates that the solution of industrial printing problems can be simple, and should not cause much worry for the plant engineer. This chart will point the way for him.

Management will often be surprised to discover how much money can be saved by sound planning of their reproduction and printing facilities. Frequently, a yearly saving of several thousands of dollars on printing bills can be realized.

TYPE	SPIRIT HECTOGRAPH	CONTACT PHOTOCOPY	PROJECTION PHOTOCOPY	STENCIL PROCESS	DIRECT IMAGE OFFSET	PHOTO IMAGE OFFSET
Properties of Original (Master Copy)						
Example of Process	Ditto	Blueprints—Black and White	Photostats	Mimeograph	Multilith	Photo Offset
Maximum Size	14" x 17"	42" wide, any practical length	29" x 37¾"	8½" x 14"	8½" x 14"	Any size
Copy Preparation	Not too easy	Normal erasing	Any type of copy	Not easy	Simple	Broad possibilities
Preparation requirements	Made on Hectograph master copy	Made on transparent sheet	Any copy that will photograph	Made on stencil	Made on special paper or plastic plate	Any copy
Set up time on machine	Negligible	None	Depends on type of copy	Negligible	About 3 minutes	4—5 hours
Possibility of re-use	Yes—up to a total of 150 copies	Many times	Many times	Yes—up to a total of 2000 copies	A few times	Indefinite if plate is kept
Type of original work						
Text	Yes	Yes	Yes	Yes	Yes	Yes
Simple line work	Possible	Yes	Yes	Possible	Yes	Yes
Engineering Drawings	No	Yes	Yes	No	No	Yes
Photographs (halftones)	No	Poor	Poor	No	No	Yes
Printed forms	Possible	Yes	Yes	Possible	Yes	Yes
Properties of reproduced copy						
Maximum number (including re-runs)	150	Any number	Any number	2000	4—6000	No limit
Writing Surface	Good	Poor	Poor	Fair for pencil poor for ink	Excellent	Excellent
Size	Same as original	Same as original	Any size up to 18" x 24"	Same as original	Same as original	Any size up to 54" x 64"
Legibility	Fair	Good	Good	Good	Excellent	Excellent
Color	Purple on white is standard — other colors difficult	Black on white only	Black on white only	Black & White is standard—color work rare	Black & White is standard—all colors possible	Any color or combination
Two side Printing	Possible	No	No	Yes	Yes	Yes
Enlargement or Reduction	No	No	Yes	No	No	Yes
Type of Stock	Glazed Paper	Chemically sensitized paper	Sensitized paper	Porous paper; colored paper possible	Any stock	Any stock
Running Speed (After set up)	75 copies per minute	4—10 ft per minute	Depends on type of copy	100 copies per minute	100 copies per minute	100 copies per minute
Appearance	Fair	Good	Good	Good	Excellent	Excellent
Management Considerations						
Cost per copy	$.35 per 100 copies	$.05 per sq ft per copy	$.10—$.15 per 8½" x 11" copy	$.60 first 100 $.20 each add. 100	$.60 for 100 cop. $1.25 for 500 $2.25 for 1000	$3.00 first 100 $.30 each add. 100 copies
Cost of Master (Not including preparation)	$.03 to $.10	Cost of drawing paper	None	Approximately 2½—15¢	$.06—$.20	Negligible
Cost of Equipment	Automatic $475—$900	$2000—$6000	$2000—$4000	Automatic Approx. $800	Automatic $2000	$7000—$50,000
Special skill requirements	None	Some training needed	Training needed	Some training needed	Special skill	Complete staff required
Degree of supervision	Routine	Average	Average	Routine	Routine	High
Usefulness for average plant	Wide	Wide	Limited	Fairly wide	Wide	Wide
Maintenance Needs	Small	Care in handling equipment	Care in handling equipment	Small	Care by Operator	Great
Company Operation	Yes	Desirable	Desirable but justified by above average demand	Yes	Recommended	Not recommended unless demand very great
Commercial Operation	No	Only if demand is very small	Recommended unless demand is very great	No	Not recommended	Recommended
Can reproducible copy be made?	No	No	No	Yes, but slow	Yes	Yes

View of twenty-three of the film casting machines at Kodak Park Plant. These units are insulated with 85% Magnesia finished with canvas

INSULATION PRACTICES At Eastman's Kodak Park Plant

Constantly expanding power and steam demand, plus facilities to meet them, mean big heat losses if insulation is not chosen and applied with extreme care . . . Many operations, too, require close temperature control—another problem which must partially be solved with insulation . . . Methods of application under various temperatures

By T. F. HOOKER, Equipment Engineer Consultant, Kodak Park Plant

EASTMAN KODAK Company's largest production center, Kodak Park, in Rochester, New York, contains more than 100 major manufacturing buildings grouped under the Film, Paper and Emulsion, divisions. Their output consists of various types and sizes of films and photoplates, photographic papers, 160 kinds of chemicals for photography, 3,400 synthetic chemicals for research purposes, and 500 miscellaneous chemicals. A service division (plant engineering) runs the railroads, builds machinery, does maintenance and repair work, and supplies power and steam for production purposes.

We have always given considerable thought to insulation design, especially where operations require an exact degree of temperature control. An example of such a situation is the insulation of the film-casting machines. These machines are used to manufacture the dry film base on which the photographic emulsion is coated. Dissolved cellulose acetate, a thick clear fluid known to the industry as "dope," is fed onto chromium plated wheels, 4 to 5 ft wide and 18 ft in diameter. As the wheels turn, steam drives off the solvents, and the dope becomes a thin, flexible, transparent sheet. The sheets are further dried by air heated to 100 to 300 F.

These complex machines are tailor-made—designed and constructed by Kodak engineers. They are insulated with 85% Magnesia, in the form of sections and blocks.

On steam lines and hot air ducts, the insulation is secured in place with No. 12 gauge, soft iron wire loops, spaced on 12 in. centers. On flat areas of the machines, there is a base coat of adhesive cement. 85% Magnesia blocks are wired over the cement and coated with a layer of asbestos cement.

The insulation is finished with a pasted canvas jacket. To provide additional protection, two layers of 10-oz canvas duck are pasted over the jacket at all corners of the machines, to a height of 5 ft above the ground.

Over a period of years, power plant facilities have been expanded until today they occupy several buildings. Also old units are continuously replaced with new and more efficient equipment. At present, total steam generating capacity is 1,390,000 lb per hr:—53 per cent generated at 820 psi, 780 to 825 F; 31 per cent at 260 psi and 550 F; 16 per cent at 210 psi and 500 F. In general, steam

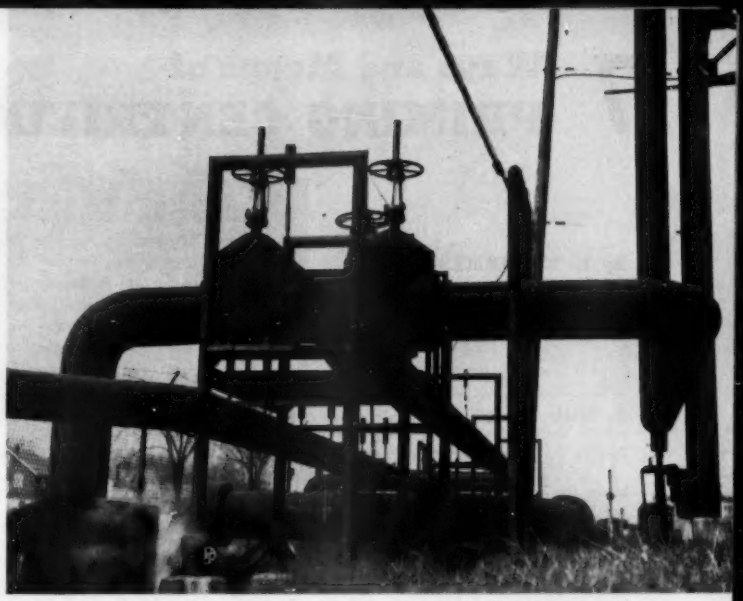
is supplied to turbogenerators, and process steam for the manufacturing divisions is extracted from the turbines at 260, 210, 135, 70 and 5 psi.

As in any industrial plant, insulation aids in obtaining a high degree of economy and efficiency in steam generation and use at Kodak Park. Since insulation procedures developed for older power plant equipment had proved so successful from the point of view of economy and efficiency, they are now employed, with some modification, for new equipment.

Diatomaceous silica and 85% Magnesia insulations, either individually or in combination, are widely used. The low heat conductivity of 85% Magnesia together with the resistance to the effects of high temperatures of diatomaceous silica make the combination particularly desirable.

Expansion and contraction of high temperature equipment may cause joints in the insulation to open. Whenever possible, therefore, double layer, staggered joint construction is used. In this way, the outer layer acts as an effective seal against heat loss through the joints in the inner layer, and a direct path to heat escape from the surface to the outside is avoided.

Method of securing and finishing pipe insulation varies with the location and operating temperature of the line involved. On hot water and low pressure steam lines, after the sectional insulation has been fitted in place, the ends and side laps of the factory-applied canvas are simply pasted down. If double layer insulation is used, the inner layer is secured with wire loops, the outer layer is applied, and the factory-applied canvas is pasted down. Insulation on steam mains and high pressure lines is wrapped with rosin-sized paper, and finished with an 8-oz pasted canvas jacket.



Steam and condensate lines run outdoors are insulated with 85% Magnesia but are finished with asphalt saturated-and-coated asbestos. Jacket is secured with copper-coated staples, ½ in. wide galvanized steel bands to assure weatherproofness

On outdoor lines, insulation is wired on and finished with a 65 lb asphalt-saturated-and-coated asbestos felt jacket. The jacket is secured with copper coated staples and with ½ in. wide galvanized steel bands spaced on 9 in. centers.

Valves, flanges, fittings and traps are insulated with material of the same kind and thickness as that specified for the adjacent piping. The insulation is applied either in the form of cement or molded sections, segments or blocks. If molded insulation is used, it is cut to fit the surface, wired in place, and all cracks and voids filled with cement. The finish is the same as that for the adjacent pipe insulation.

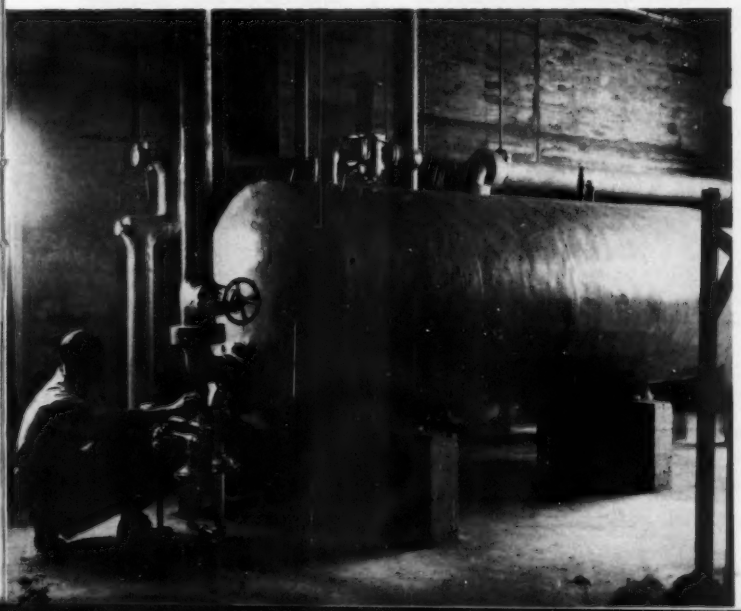
Equipment, such as heaters, pumps, tanks, etc., is generally insulated with block insulation, wired or banded in place. Small, irregularly shaped equipment is insulated with block and cement, in the same manner as valves and fittings. Where necessary, as in the case of the heads and lower halves of large horizontal tanks, clips or angles are welded to the vessel surface to serve as anchor points for the wires or bands.

Hexagonal wire mesh is stretched over the equipment insulation and wired in place, to serve as a foundation for the asbestos cement finish. The cement is troweled on in two coats, each ¼ in. thick.

Removable heads on evaporators, heaters, and similar equipment are individually insulated so that the heads can be removed without disturbing the adjacent insulation. Insulation on ducts, flues, hoppers, and fan housings is protected by metal corner beading strips which not only prevent the wires from cutting into the insulation along the edges but also make an attractive looking installation. Insulation around bolted or hinged doors in fan housings or ducts is cut back so as to permit full opening or removal of doors without damage to the insulation.

Insulation thicknesses are chosen on the basis of the fuel costs, hours of operation and other operating conditions prevalent in our plant. Tables of thicknesses are available from manufacturers.

Process hot water heater, steam and hot water lines are insulated with sectional insulation. After it is fitted in place the ends and side laps are pasted down



7 Ways and Means of PRIMING CENTRIFUGAL PUMPS

By H. B. HUMMER
Pump Section
Norwood Works
Allis-Chalmers Mfg. Co.

THESE ARE THE SEVEN—

1. By flooding the suction side of the pump
2. By by-passing around the discharge check valve
3. By using an automatic primer
4. By use of an outside supply
5. By hand or manually controlled priming pump
6. By means of an ejector
7. By manually or automatically controlled dry vacuum pump

THE BASIC REQUIREMENT in priming centrifugal pumps is to bring the liquid level at least to the top of the impeller eye. If this is not done, the impeller will merely agitate air when started. Despite the simplicity of this one basic requirement, a large number of "ways and means" have been devised for its accomplishment—each method being adapted to particular operating conditions. The predominance of centrifugal pumps in industry makes valuable an understanding of the methods most frequently used.

The choice of method is usually dictated by the pump location, the liquid handled and the type service or operating conditions of the system served.

1 The least complex priming arrangement is shown in Fig. 1, with the impeller eye well below the surface of the liquid supply. This places the pump under a positive suction head at all times, and is known as either a flooded suction or positive suction head arrangement. Such pumps are self-priming and are considered necessary and ideal when handling liquids whose vapor pressure exceeds or equals atmospheric pressure (for example, water at 212 F).

When starting such pumps for the first time, open the gate valve in the suction line and close the gate valve in the discharge line. Open all air vent valves and leave them open until all air is expelled and liquid flows from these openings. Close all air vents, start the pump and open the discharge gate valve. This leaves the pump primed for future starting.

In some applications it is desirable to provide float switches which will stop the pump at a predetermined minimum level (to avoid "losing the prime") and start the pump at a predetermined maximum level to avoid flooding the reservoir. A typical installation of this sort is a sump pump.

Centrifugal pumps located above the source of supply with a suction lift (negative suction head) can be primed and the prime held by a foot valve at the end of the suction line. The foot valve should be flap type, rather than the multiple spring type, with a clear passage at least 50 per cent greater than the suction pipe area.

There are two methods of priming with foot valves installed at the end of the suction line; from outside supply (Fig. 4); or by by-passing around the discharge check valve (Fig. 2).

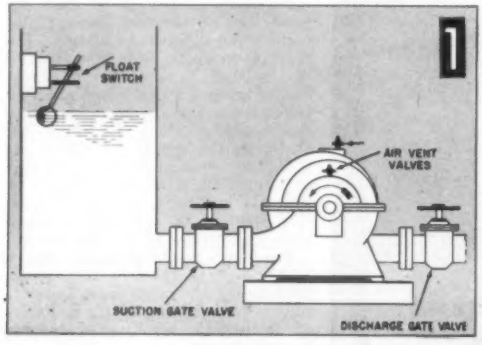
2 The arrangement shown in Fig. 2 can be used only when the discharge pressure is positive and the discharge line holds a substantial reservoir of liquid. Initial prime, of course, must be established through an outside supply of some sort due to the lack of any reservoir of liquid in the discharge line. After subsequent idle periods, open the air vents and shut-off (by-pass) valve around the discharge gate and check valves. When liquid flows from the vents, close these and the by-pass valves, start the pump, and then the discharge gate valve.

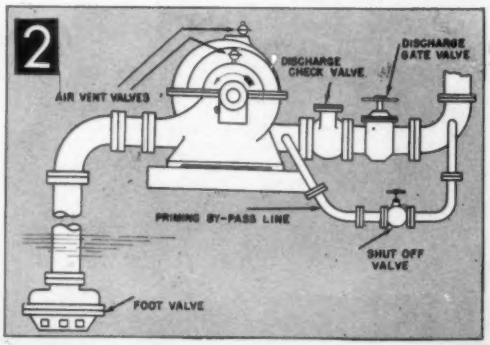
If the by-pass valve can be left open in idle periods, any loss of liquid through the foot valve is constantly replenished from the discharge pipe. This system is used for automatic operation when idle periods are short and the discharge line is not likely to be drained by a leaky foot valve. In this method, the foot valve must be able to withstand pump pressure and surge.

3 An automatic priming tank which is divided into two parts, one above the other, is shown in Fig. 3. For the initial prime, it is necessary to fill the lower section of the tank with liquid. The pumping unit is then started up, drawing liquid from the lower tank and discharging it into the upper tank. As the level in the lower tank is drawn down, a vacuum is created thereby drawing in liquid from the suction line. During operation, the pump discharges through the upper tank and builds up a small reservoir which, when the pump stops, flows back into the pump and lower tank. The supply in the lower tank then serves to flood the suction and prime the pump on the next starting.

To select the proper size primer, it is necessary to determine the size and length of suction pipe as well as the suction lift. When figuring the length of the suction pipe, both the horizontal and vertical sections must be included. The total required suction lift will be the distance between the liquid level in the suction pit and the point where the suction enters the primer plus the friction losses in the suction line.

4 Close the discharge gate valve and open all air vent valves, then open the external supply line gate valve until all air is expelled and liquid flows from the vent openings. Close the external supply line valve and air vent valves; start the pump and open the discharge gate valve. Details of the setup in Fig. 4.



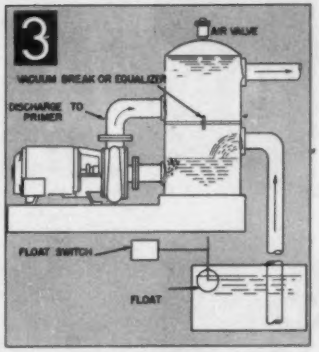


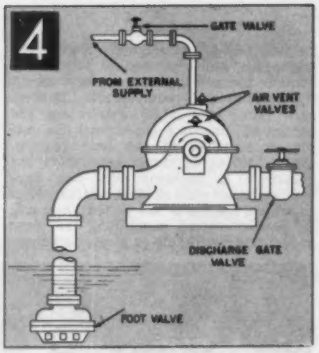
5 Another system which may occasionally use foot valves to simplify priming is shown in Fig. 5. A separate priming pump is used: A—to draw air from the pump casing and pull priming liquid in through the suction, or B—to force air out the air vents by pumping liquid into the casing.

In case A, close the discharge gate valve, keep the air vent valves closed, and open the valve in the priming pump line. Air should be exhausted from the pump and suction piping until liquid flows from the priming pump. Close the valve in the priming line, start the pump, and open the discharge gate valve. The amount of liquid required to fill the pump and suction line should be known so that the proper priming pumps can be supplied.

By reversing the connection on the auxiliary priming pump, case B, and extending the priming pump suction to the supply, the larger pump may be primed by pumping liquid into its casing until it flows from the air vents.

6 Ejector priming (see Fig. 6) is similar to the method employing a separate priming pump, case A. The ejector is operated by steam, compressed air or liquid under pressure and is connected to the top air vent on the pump casing. The discharge gate valve is closed, valve A is opened (to the steam, air or liquid line), and valve B in the ejector suction is opened. Air will be evacuated and liquid drawn into the suction pipe and pump casing. When all air is evacuated, close valve B, close valve A, start the pump, and open the discharge gate valve.

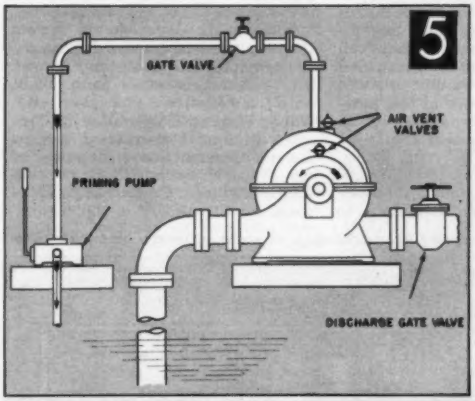


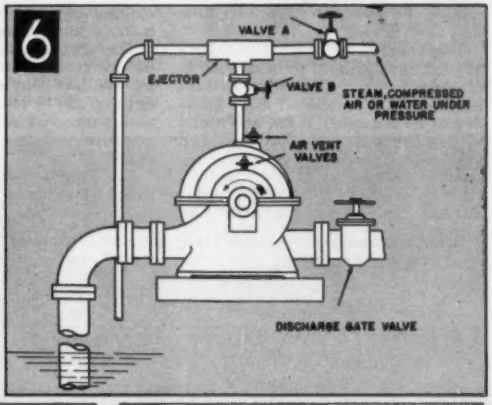


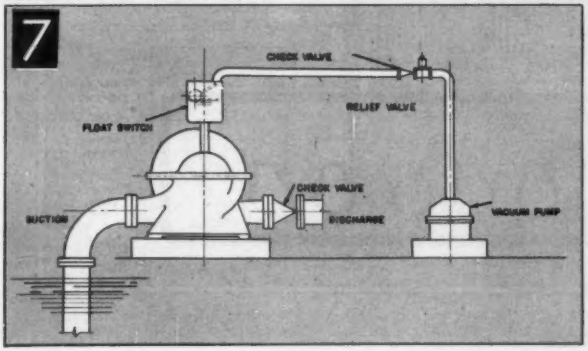
7 The automatic control system shown in Figure 7 is especially suitable where there is a fluctuating suction lift that might drop below the normal limits of the pump; or it is suitable for installation where there is any quantity of air mixed with the liquid which might air-bind the pump. The float switch in the priming chamber automatically starts and stops the vacuum pump, thus maintaining liquid in the pump at all times. This switch should also be interlocked with the starting switch on the pump so that it cannot be started without being fully primed.

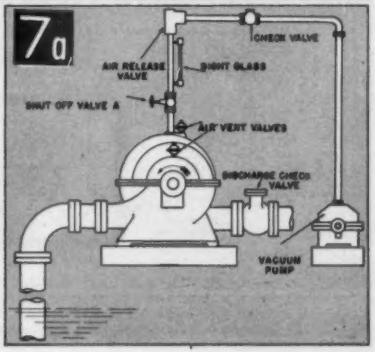
The systems discussed here are only those in general use. It is likely that the flooded suction method of priming would be the only one in use if all pump installations could be made below the supply level, but the duties of pumps are much too varied to be limited by location factors. The priming systems given here—and many other highly specialized systems—have greatly added to the pump's usefulness by making possible dependable operation in odd circumstances.

Manually controlled dry vacuum pumps (Fig. 7a) require a float-controlled air release valve which will permit air to pass but will close when liquid fills the chamber. This prevents liquid from being drawn into and damaging the dry vacuum pump. To prime with this system, open valve A and start the dry vacuum pump. A level indicator or sight glass in the riser should be included to determine when the pump is primed. Close valve A, stop the vacuum pump and start centrifugal pump.









Below: Specially-designed master control panel which is used to selectively control the seven steam generators on the basis of load requirements. If pressure rises, the steam generators are turned off, one at a time, until the output is matched to the load requirements. Wires to steam generators are combined in separate cord and plug sets for each unit so that the sequence in which the units are called upon can be readily varied, equalizing the wear and making it simple to disconnect them

Above: Each of the steam generators in the U.P. laundry develops 200 psi steam in two minutes, feedwater at 50 F.

Boilers to Keep a Railroad Clean

THE NEW UNION PACIFIC Railroad laundry, now being built in Ogden, Utah, is installing a battery of seven steam generators capable of heating up all the water needed in minutes from the time they are fired.

This method of heating will permit handling of 3300 lb of dry laundry every hour. Planned procedure calls for 13,333 pieces of dirty laundry to be unloaded at the south end of the newly erected building, and within an hour and a half to come out the other end of the building, washed, dried, ironed, folded, counted and tied in bundles ready for delivery to the commissary across the street.

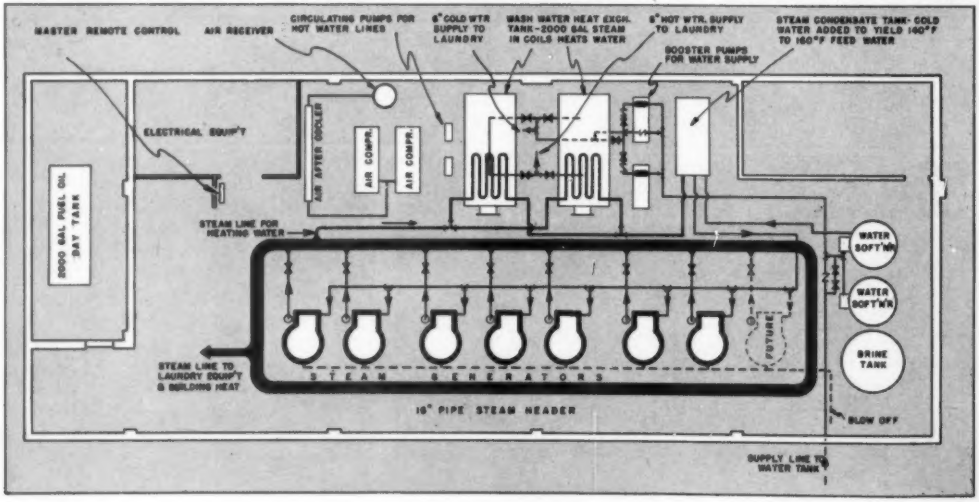
There are seven of the units installed in the new Union Pacific laundry and each unit is capable of making over 4500 lb of steam an hour, a total of over 31,500 lb.

The speed with which they can be put into operation is illustrated by the fact that each machine can develop 250 lb pressure in two minutes from cold water; about 100 lb pressure will be used in the laundry.

Generators are fired with No. 2 fuel oil and are completely automatic in operation from one-third to full capacity. A specially designed steam pressure switch turns on the fire in one or more units when steam pressure is high. Each machine has an electric eye to turn the unit off if the fire does not light up properly.

A complete dry cleaning system in the plant will handle drapes and uniforms for all over the railroad. The steam generators were made, and installation supervised by, Vapor Heating Corporation of Chicago, Illinois. Construction was by Larson Construction & Engineering Co. Supervision by W. C. Perkins, Chief Engineer, Union Pacific Railroad.

Schematic hook-up of steam generators showing location of auxiliary equipment such as water softeners, heat exchangers


MASTER REMOTE CONTROL
AIR RECEIVER
CIRCULATING PUMPS FOR HOT WATER LINES
6" COLD WTR SUPPLY TO LAUNDRY
WASH WATER HEAT EXCH. TANK-2000 GAL STEAM IN COILS HEATS WATER
6" HOT WTR. SUPPLY TO LAUNDRY
STEAM CONDENSATE TANK-COLD WATER ADDED TO YIELD 160°F TO 180°F FEED WATER
BOOSTER PUMPS FOR WATER SUPPLY
ELECTRICAL EQUIP'T
AIR AFTER COOLER
AIR COMPR.
AIR COMPR.
8000 GAL FUEL OIL DAY TANK
STEAM LINE FOR HEATING WATER
WATER SOFT'NR
WATER SOFT'NR
FUTURE
BRINE TANK
STEAM LINE TO LAUNDRY EQUIP'T & BUILDING HEAT
STEAM GENERATORS
10" PIPE STEAM HEADER
BLOW OFF
SUPPLY LINE TO WATER TANK

The Empty Pallet Freight Rate Story Now Brought Up To Date

Widespread fight for lower freight rates on empty pallets achieves success . . . Industry responsibility to the carriers . . . What it means to the safety man, the materials handling man, the shipping department and labor relations . . . The warehouseman given three instead of two dimensions to work with . . . Coordination of inter- and intra-plant movements of manufactured goods and parts . . . Dangers of over and under packaging . . . Container and rack engineering

By DON W. KELSEY, President, Michigan Chapter, Society of Industrial Packaging & Materials Handling Engineers

DURING WORLD WAR II the need for moving tremendous quantities of material quickly and safely gave great impetus to the materials handling industry. The fork truck was then at least 25 yr old, but it was not until the Navy used it for lifting and moving battle cargo that the great potential of this type of equipment became recognized. Many new handling methods and products were developed in that time of crisis to meet an urgent need.

After the war, industry stood to benefit by the experimentation and technical progress made by the armed forces, for many engineering theories of materials handling had been proven by practical application in the field. With cessation of hostilities, a large number of the men who had directed the handling and warehousing program for the war effort, turned their talents and knowledge to the improving of industrial methods of handling material. These men, who had seen the science of materials handling operate in war time, realized the possibilities of its adaptation to factory use.

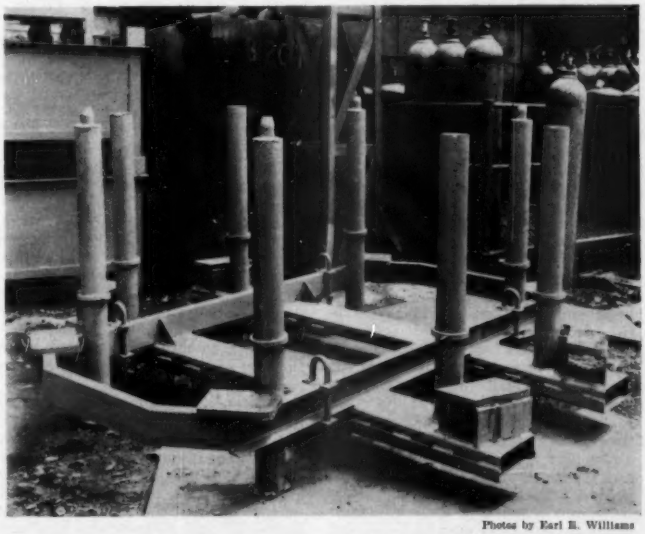
These materials handling men had a hard job ahead of them. There were few men in top management who shared their belief in the value of materials handling and were willing to authorize the large expenditures necessary to mechanize their handling departments. Industrialists had long recognized the savings to be accomplished by labor-saving devices in and around the machines; but the idea of time-and-labor saving in the movement of materials to and from these machines was a new concept.

Few companies, five years ago, had materials handling departments as such. Usually there were one or two individuals in the organization who had some interest in, or knowledge of, the field. It might be a plant engineer, methods engineer, a shipping clerk, or even a vice-president who could see the potentialities.

There was a big educational job to do in industry. Management had always been accustomed to the use of manpower in handling material. The cost of this manpower was such a part of the industrial picture that few men realized just how large the handling bill was. Before the use of the fork truck, industry spent about nine billion dollars a year, roughly one-fourth of its entire payroll, for handling material in the factory.

As industry becomes more completely mechanized, it is estimated that a million men will be released from materials handling to other productive jobs. In times of war preparation, with the resultant shortage of manpower, it is not hard to recognize the value of such a savings. It is because of this element that the armed forces are intensely interested in promoting the growth of mechanized handling in industry and commerce.

The wide range of benefits from efficient materials handling goes far beyond a mere savings of manhours by the use of modern methods. For this reason many groups of men, not primarily concerned with the actual movement of material, have become interested in the field. One of these groups is the safety engineer. It is estimated that seven-



Photos by Earl E. Williams

Fig. 1. Much inter-plant movement can be facilitated by properly designed racks. The one shown was developed to handle tank turret rings from rough forgings thru production and hold the rings within thirty thousands parallel at all times. By the use of aluminum spacers ten rings can be carried at one time

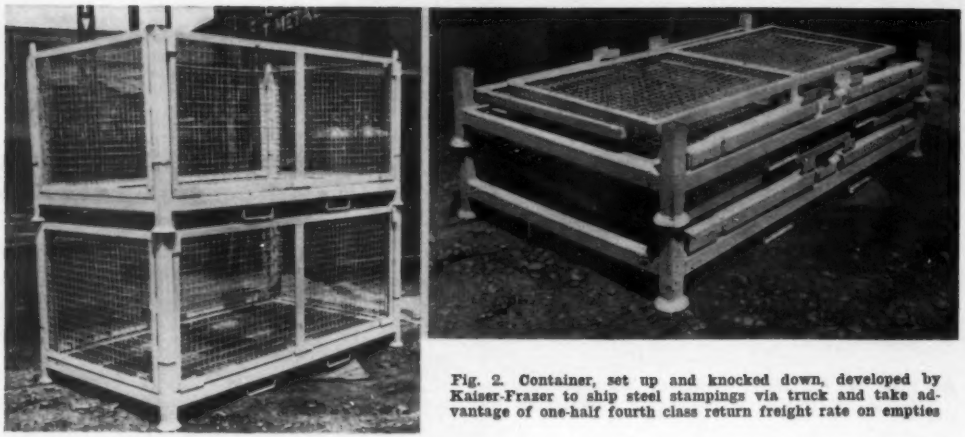


Fig. 2. Container, set up and knocked down, developed by Kaiser-Frazer to ship steel stampings via truck and take advantage of one-half fourth class return freight rate on empties

ty per cent of all industrial accidents are caused in the handling of materials; modern methods and equipment are rapidly reducing the number of these accidents.

Safer handling reduces not only the loss of manhours, but more important, the loss of life and limb. In addition, it reduces the premium paid by the company for compensation insurance. Less concrete, but just as important, is the good effect on labor relations which result from the prevention of unnecessary accidents.

Another group of employees who have benefited by the increased use of palletized handling are the shipping, receiving and warehousing men. These men have been compelled, by the limitation of their equipment, to think of space in terms of square feet. Mechanized handling makes it possible to figure space in terms of cubic feet. Many, many warehouse men, cramped for space and unable to build more storage area due to the excessively high construction cost, have turned to their materials handling men for help. By proper storage of material in unit loads, it is possible to utilize nearly the entire cubic capacity of the warehouse.

In the past decade, then, industry has become increasingly aware of the great savings possible through improved handling methods inside the factory. Engineers have developed hundreds of new tools and thousands of ingenious methods for moving material quickly and efficiently from one portion of the plant to another. But the technique of transporting material between separate plants, or between a facility and its distribution point, has lagged behind. Materials handling men were handicapped in their efforts to reach beyond their own factories and improve transportation methods.

Handling engineers have long recognized the value of unitized shipping, not only to the shipper and receiver but to the carrier as well. They were aware of the great savings in manhours in loading and unloading unitized shipments, as compared to loose handling. But it was the traffic man who was able to prove these facts to the common carrier. Through his knowledge of the trucking industry, he was able to arrange for test shipments which showed the trucker, by actual statistics, that palletized shipments reduce materially the detention time of the truck and consequently the manhours of the carrier's personnel. Trial runs showed that a truck could, in a given period, carry as much as four times the freight in palletized material as in loose material[1].

On many types of shipments materials handling men find that a permanent type of pallet or container is more efficient than the expendable type. The chief impediments to a wider use of this permanent type have been the high initial cost of the equipment and the high cost of returning the empty container to the point of origin.

The higher initial cost is easily compensated for when it is spread over the many trips made by a permanent container, but the return freight costs have in many instances materially reduced, or even eliminated, the savings effected by the use of this type of equipment. Traffic men believed that the carrier could afford to allow a reduced return rate on these empty containers in view of the advantages to him in palletization.

At first truckers were reluctant to go along with this new rate program, but gradually the more progressive carriers are arranging to publish new rates which are fair to both shipper and transporter. In 1948, a proposal was made to the Central States Motor Freight Bureau[2] by fourteen motor carriers for reduced return rates for containers and pallets, on a point-to-point basis, covering twenty-nine points. These rates were published in October 1949. By May of 1951, the number of carriers participating had increased to seventy-four and the number of points involved had grown to seventy-one. This single case showed that the number of truckers cooperating in the new program had increased five times in a period of three years.

In the past four years there have been many hearings before various state and territorial bureaus and before the Interstate Commerce Commission to consider proposed commodity rates on pallets or palletized shipments. On October 24, 1947, application was filed by the Automobile Manufacturers Association[3] with Central Territory Railroads[4] (CFA Docket No. 56328), as well as with the Central States Motor Freight Bureau and the Michigan Intra-State Motor Tariff Bureau.[5] This application requested that a rate of one-half of fourth class be published on the return of pallets, platforms, or skids, including necessary separators, sides, ends, stacks or standards, detached or flat, metal or wood, or metal and wood combined, in any quantity.

On November 24, 1948 rates were published[6] on returned "pallets, skids, platforms, knocked down, folded flat," on the one-half of fourth class basis for application via motor common carriers in Indiana Intra-

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[1] See "Battle for Lower Freight Rates on Empty Pallets Widens," page 55 January 1949 issue.

[2] Central States Motor Freight Bureau, 316 E. Ohio St., Chicago 11, Ill. Area covered bounded on the east by Buffalo and Pittsburgh, on the south by the Ohio River and on the west by the Mississippi River.

[3] Automobile Manufacturers Association, New Center Building, Detroit, Mich.

[4] Central Territory Railroads, 22 W. Madison St., Chicago 2, Ill. Docket No. 56,328 is the file number under which this was handled. Area covered by the CTA is the same as outlined in footnote 2.

[5] Michigan Intrastate Motor Tariff Bureau, 415 Hollister Bldg., Lansing 8, Mich.

[6] "Fight for Lower Freight Rates on Empty Pallets Gains Impetus," page 35 April 1949 issue.

state traffic,[7] on a point-to-point basis. By May of 1949, the Ohio Motor Freight Bureau[8] had made effective the return rates of one-half of fourth class on pallets, platforms, skids, knocked down or folded flat, intra-state in the State of Ohio. Then in July of 1949, one-half of fourth class rates went into effect in the State of Michigan on a point-to-point basis.

Rates Approved

The most important of these hearings was that before the Interstate Commerce Commission who on November 27, 1950 approved[9] as reasonable rates on the "one-half of fourth class" basis on returned pallets, platforms or skids, knocked down or folded flat. As a result of this I.C.C. decision,[10] the Central State Motor Freight Bureau published the approved basis (one-half of fourth class) effective January 23, 1951 on pallets, platforms, skids, knocked down or folded flat, in Central State Motor Freight Bureau Tariff 463, MF-ICC No. 412 for the account of many Bureau members. This tariff was issued on a point-to-point basis to handle traffic to and from specific points in the following states: Illinois, Indiana, Kentucky, Michigan, Missouri, Ohio, Pennsylvania and Wisconsin.

Industry Gets Responsibility

In return for reduced freight rates on returned shipments, industry must take the responsibility of seeing that these rates prove beneficial to the carrier. Materials handling and traffic men must insist that certain conditions exist which make palletized movements profitable to the carrier as well as to industry.

The most important single factor in efficiently utilized shipping is probably the use of the proper container or package for each particular job. Each load must be analyzed as a materials handling problem in order to predetermine the package most adaptable to the movement concerned. First, the container or package must be strong enough to carry the load, both in transit and in the storage area.

Overpackaging

If the container buckles and spills the load, or if the container is not strong enough to withstand stacking from floor to ceiling in the warehouses, then the package must be redesigned. On the other hand, overpackaging is another common fault, and is conversely nearly as bad. Too much packaging not only wastes time and money for the shipper, but results in excessive freight charges on the shipment and unnecessary labor on the part of the receiver.

There are innumerable cases in industry where the containers used are far too bulky and heavy for the application. In some instances corrugated steel tubs weighing 400 to 600 lb were used to transport loads lighter than the containers themselves. Shipping containers, too, are often found to be far heavier and bulkier than are required for efficient operation. Such equipment is excessively costly, not only in the outgoing freight rates, but in the return rates for the empty container.

Unitized movements in inter-plant shipments eliminate much unnecessary packaging. If the containers are properly engineered, it is possible to transport the majority of parts, even those with critical dimensions, without any protective packaging. This becomes an important factor when you take into consideration the thousands of parts being manufactured for our war effort which must be held to dimensions measuring in tenths of thousandths. All these parts can be shipped cheaply and safely in palletized loads, if the men responsible know their jobs.

We have come a long way in the field of materials handling, but there is much more to be done. And since shipping capacity is one of the crucial shortages in our present program, materials handling in industry and commerce becomes an important phase in our whole preparedness economy. The armed forces recognize this fact — industry should too!

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[7] By the Indiana Freight & Tariff Bureau, 8 Market St., Indianapolis 4, Ind.

[8] Ohio Motor Freight Tariff Committee, 135 N. Front St., Columbus 15, Ohio.

[9] "The Pallet Boys Win! Half Fourth Class Rate Over Wide Area," page 4, January 1951 issue.

[10] Investigation and Suspension Docket No. M-3166. Handled by Division 2 of the Interstate Commerce Commission with the decision written by Aitchison, Splawn and Alldredge.

How to Correct Frost Heavage in Freezer Rooms

FLOOR CONSTRUCTION for freezer rooms that are built directly on or below grade level must receive special engineering attention to prevent frost heavage. This is particularly true of large rooms. Unless there is continuous supply of heat, beneath the freezer floor, experience has shown that ice forming in the earth under the floor may eventually buckle the concrete slab, according to Armstrong Cork Co., Lancaster, Pa.

One possible solution is to remove all stored goods and produce from the freezer areas and take the room completely out of service by shutting off the refrigeration. Then the entire finished wearing floor, floor insulation and subfloor must be removed together with about two feet of the frozen subsoil. The frost in the ground must be permitted to thaw. When all evidence of frost has disappeared, a coarse aggregate fill should be placed over the subsoil. An adequate ventilation system and a new concrete subfloor should then be installed. Insulation, in proper thickness to hold the desired temperature plus a finished concrete wearing floor, completes the new installation.

Sometimes, however, it is more practical to work around the exterior of the building. Excavate a trench around the perimeter of the building. Steam, hot water, or warm oil pipes should then be installed at the bottom of the footings on the outside. The resulting heat will penetrate the foundation walls and footings and thaw out the ground.

Around the interior free standing columns or piers, well points may be driven at each location and low pressure steam forced through them. This will necessitate a slow process of thawing the ground with steam, hot water, or warm oil in order to drive the well points as deep as necessary to remove all frost from below the existing foundations. Depending on the amount of heavage and cracking of the floor, it may be necessary to replace it.

Due to plant layout and surrounding conditions it may be impossible to allow sufficient space for through ventilation when rebuilding a damaged freezer-room floor. In this case, after the existing floor construction has been removed, a system of wrought-iron pipe grids may be applied on a crushed stone foundation. This piping is similar in appearance to a radiant heating installation, and warm water or fuel oil is circulated through the pipe grids. After connections are welded and tested, a concrete subfloor should be poured over the grid system. This serves as a foundation for insulation and the finished concrete wearing floor.

All of the alternatives involved in dealing with frost formation once it has occurred are costly. To prevent this happening, it is recommended that an adequate ventilation system be installed while the room is being built. The system should consist of air ducts or sewer tile spaced at regular intervals across the small dimension of the room under the subfloor of the freezer. The ducts or tile should extend above the grade on both sides of the room to permit natural circulation of air under the subfloor at all times.

New Lever Plant—$25,000,000 Engineering Paradise

Safety features, construction innovations and continuous, automatic flow of manufactured product are some of the sound engineering devices enabling this newest plant of an old, established company to produce 270,000 lb of product in one year with its present 350 employees

LEVER BROTHERS Co.'s eighth U. S. plant went into operation in Los Angeles in mid-June. Even before its construction, it had chalked up a "first"—was tabbed as the largest private manufacturing investment in Los Angeles County industrial history. Total investment: $25,000,000.

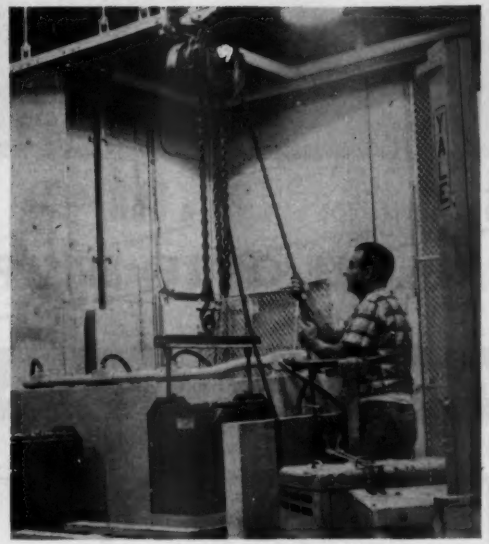
Plant experts, visiting the new 30-acre site, and walking through 415,000 sq ft of production area, come away with a better understanding how this soap, detergent and edible-oil facility can produce 270,000 tons a year, yet need but 350 employees (at present) in the process.

Key to the new plant's design: Continuous flow, automatic wherever possible. Some of the products to be produced will include Lux Toilet Soap, Rinso, Spry, Good Luck Margarine and half a dozen other Lever specialties.

Focus of the plant is a four-story, air-conditioned office

Left: Lobby view at night during which several production operations are carried on as part of two-shift schedule. Below: In this huge tank farm are stored millions of gallons of oils and fats awaiting processing in the new Lever plant at rear

Instead of calling attention to overhead obstruction, the designers have simply curved the railing around obstruction



One corner of the battery-recharging station, one of the most modern. Battery pit is drained via glass lined pipe

building and quality control lab. The labs have special grounded flooring, deluge safety fountains for accidents involving acids, six rooms containing the most modern in laboratory equipment.

The office structure is flanked by a five-story soap finishing and packaging building on one side; by a six-story shortening products finishing and packaging structure on the other. Stair towers connect the office building with the finishing buildings. Behind each finishing facility, and connected by separate 87 ft clear-span bridges at the fourth floor levels, are processing buildings for soap and edible oils. Piping crosses from processing to finishing buildings via the roofs of these clear-span bridges. Between the two processing buildings are the boiler plant and refrigeration units.

Much of the processing area, especially tank farms, hydrogen gas plant, oil storage and weighing, Rinso and No-Rinse Surf towers are out-of-doors, in the open except for covered operations areas. A four-story jack knife stairway in the administration building features single beam support at each stairway landing, no supports elsewhere intermediately.

A large fish pond extends from the exterior lawn of the administration structure inside the lobby, giving a tropical effect.

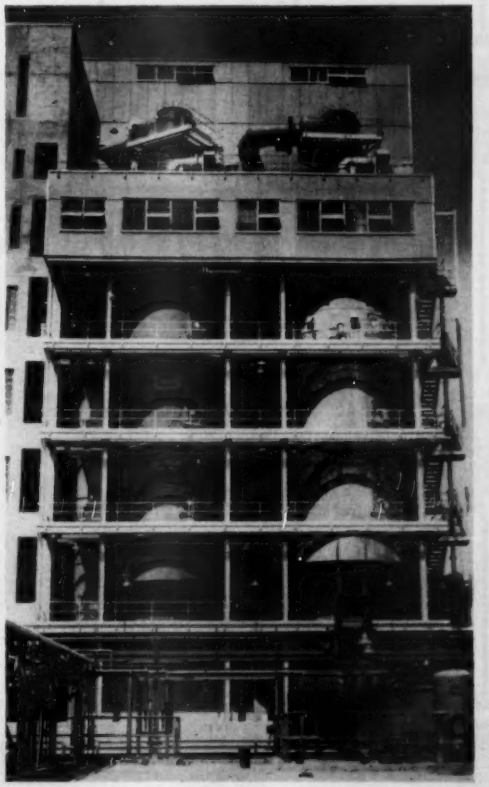
Tank car unloading facilities include two of 6 and 8 car capacity petroleum-type track facilities—the first installation, it is said, for a soap and edible oil processing plant. One trackside unloading dock, with safety bridges to tank cars, is for soap ingredients, the other for edible oil raw stock. Deluge fountains, both shower and eye wash, are located at either end of the edible oil unloading dock, safety measure against injury from soda ash and caustic soda. Carload facilities are located midway between the processing and finishing buildings.

First installation of an ion exchanger is another feature of the plant. This, the first commercial-sized unit for separating glycerine from lye water, is set-up out-of-doors.

Key to the entire plant's efficiency is materials handling. Some typical examples:

Salt, which is used in large quantities in the soap-making process is unloaded from boxcars, via a scoop-rigged fork-lift, carried to a fourth floor salt storage area (holds 4 carloads) via conveyor, where the salt

Below: Partially out-of-doors construction is one of the features of the new plant. Surf and Rinso towers shown here



A B C E

FROM ALL OF LEVER'S PLANTS CAME THE MEN V

MANAGEMENT STAFF – L.A.

S. J.

District Traffic Mgr.

M. Glen A

Industrial Relations Mgr.

G. F. Duncan E

Chief Chemist

W. C. Skarda N

Production Superintendent

R. C. Hatter B

Plant Physician

Dr. J. E. Howard O

Ass't. Chief Chemist

F. D. Newcomb E

C D. W. Thomas

Senior Traffic Clerk

R. W. Mahony C

Industrial Relations Sup'vr.

B. C. Searle O

Safety Supervisor

E. V. Windsor O

Standards Inspector

J. C. Venuto O

Spry Supervisor

E. J. Vyborny E

Soap Production Supervisor

G. W. Stout C

PMA Supervisor

J. J. Phillip H

Powder Shift Supervisors

C J. Glover

J. L

Warehouse Foremen

O W. J. Wark

W. R. Chenard O

LTS & Lifebuoy Foremen

O T. C. Downey

T. F. Grace C

Lux Foreman

J. N. Fitzgerald O

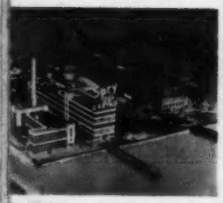
Rinso Foreman

S. S. Derbyshire O

Surf Foremen

B J. W. Niemi

E. C.



H S N

WHO ARE THE MANAGEMENT OF THE NEW PLANT

KEY:

Saw Latest Service at —	A Ayer	H Hammond
	B Baltimore	S St. Louis
	C Cambridge	N New York
	E Edgewater	O Newly Hired

H

Process Superintendent

A. W. Willoughby H

Office Manager

E. L. Kacer N

Plant Engineer

R. E. Sessler H

Purchasing Agent

W. J. Moke O

S

Soap Production Superintendent

F. P. Brown H

Special Accountants
H
F. E. Schnecke

C. R. Zeller H

Chief Engineer

J. P. Walsh O

Mechanical Superintendent

C. M. Bork C

Edible Process Supervisor

W. H. Friedhof H

Oil Handling & Glycerine Sup'vr.

G. E. Hingwarth C

Engineering Assistant

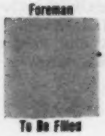
E. O. Wilcox E H

Engineering Assistants

A. E. Bowen, Jr.

T. R. McCullough C

H

Edible Process Foreman

To Be Filled

Soapery Foreman

W. A. Finck B H

Oil Handling & Glycerine Foremen

J. Lee

A. J. Strauch O

Instrument Foreman

F. P. Edmonds O

Chief Electrician

J. J. Singleton O

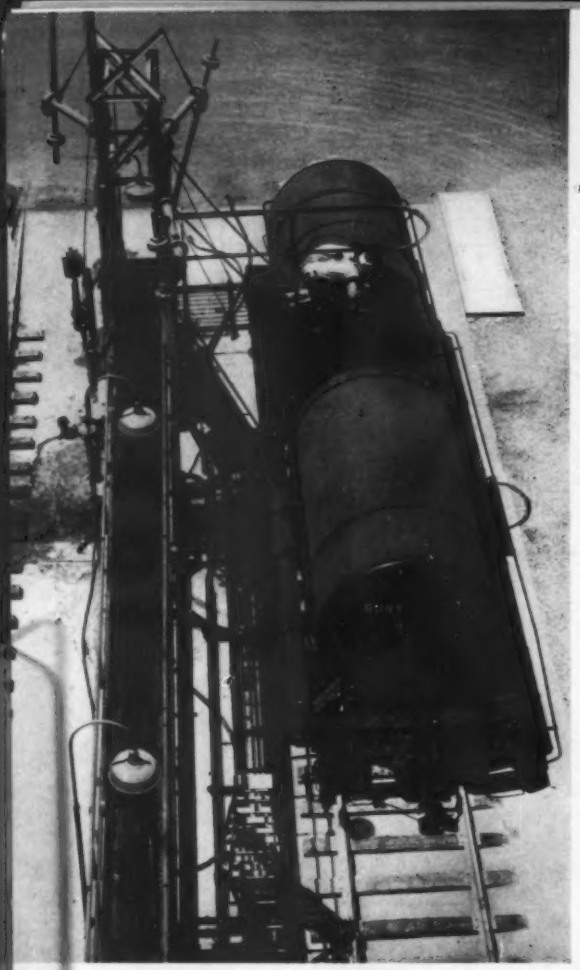
Mechanical Foreman

F. C. Feyling C

Service & Stores Dept. Foreman

L. A. Bamford C

C



These facilities were reported as a "first" in the adaptation of tank car unloading facilities to a soap-edible oil plant

is dumped through hydraulic, remotely controlled gates.

In the salt section (whose prime function is to charge ten 180,000 lb soap kettles immediately adjacent) specially-built gondola dump trucks, 1200 lb capacity, are lifted via 2-ton electric fork lifts, carried to the kettles and dumped. Salt is reclaimed, from lye-water-salt drained from the kettles, by centrifuge and evaporator processing. Reclaimed salt is used to charge the kettles. Reclaiming cuts to a minimum the amount of salt make-up necessary.

All buildings are ramped for fork lifts. They also are equipped with elevators which move the fork lifts from floor-to-floor. A special battery maintenance section, housed in a 6 by 6 ft pit, can simultaneously charge 12 batteries. This department is installed with two Hobart rechargers, and a standby for recharging batteries while still in the fork lifts.

Batteries are lifted from trucks by a 1½ ton hoist running around the pit supported by a monorail. Battery maintenance will see that each truck's battery is recharged every shift with a continuous record kept on each.

The battery pit is drained via glass-lined pipes. Acid solutions are diluted with water before disposal.

The plant's other materials handling features: unloading of tankers carrying the base ingredient for Surf, via pumps working through flexible hoses. Located out-of-doors are the two 85 ft tall spray towers for making Surf and Rinso and several other Lever products. This is the first time that Lever towers have been constructed out-of-doors, a move made possible by California climate, its lack of heavy rain.

Most tanks, including a 300,000 gal water tank, have flexible, earthquake connections.

In water-short California, water reuse is an important industrial factor. The Lever Brothers' plant, which normally consumes two or three thousand gallons of water per minute, has installed three separate cooling tower systems, which constantly recirculate water through heat exchangers, vacuum equipment, etc.

Cooling towers lower water temperature from approximately 110 to 80 F, uses 8 horizontal four-bladed fans and 16 circulating pumps in the process. These towers have reduced the plant's consumption of new water to about 400 gpm.

Piping (there are 150,000 lineal feet of it) required special and careful color coding and banding. All pipes at entrances to processing sections are color-banded, with content of pipes stenciled over color-coded band. This holds true also where pipes are carried via the bridges from processing to finishing buildings.

While soap packaging departments are not air-conditioned, ventilation, both natural and fan type, keeps soap dust to a minimum. Special one-piece fatigue uniforms have been provided for packaging department girls, who usually wear light masks while operating the packaging lines. Girls have a neat, attractive rest room off the packaging department. Foremen have a special locker room, with showers, easy chairs, and a shoe shine stand.

Cleanliness More Than a Virtue

Lever officials explain that they like to see their people leave the plant neatly attired, not begrimed as in some industries. A 400 seat cafeteria in the administration section serves two meals a day, at cost. A feature of the kitchen: completely tiled floors, ceilings and walls. Stainless steel-clad equipment throughout. Air conditioning in the cafeteria.

The steam plant has three, 85,000 lb per hour boilers, working on natural gas, with bunker C fuel oil as a standby. An annunciator panel lights up if any boiler plant equipment fails. Because Southern California is short of natural gas during peak winter loads, the Lever plant has a tank farm, housing two 30,000 gal propane tanks. Propane is used as a standby for the processing section, including burners in the Surf and Rinso towers.

Plant maintenance departments, including a special machining section charged with keeping packaging equipment in shape, are housed in areas just off production units, yet separated from them. The packaging equipment maintenance department, a large-sized machine shop in itself, is located midway between edible oil and soap packaging sections.

Lever engineers squeezed all the modern safety devices possible into this new plant. For one thing, they don't like conventional rung ladders, consider them an accident-breeding place. Thus, non-slip treads were installed on ladders to the 85 ft Rinso and No-Rinse Surf towers instead of conventional round rungs. Concrete floors in the manufacturing areas are slip-resistant, with abrasives poured into the concrete decking.

Where hand rails on stairways pass under overhead obstructions, the rail juts out, automatically by-passing the user from under the object. Deluge fountains and eye washers are located wherever contamination with dangerous chemicals is a hazard. These fountains work automatically when a worker steps into their area of operation.

Tank car unloading docks are equipped with on-the-spot emergency rescue devices, including harnesses for protection of men in the cars when cleaning is necessary. Standard-marked piping prevents incorrect valving. Bridges between buildings are walled shoulder-high. Special drains and gutters at tank and mixing areas keep chemicals confined should a leak occur.

Photoelectric Control for Yard and Guard Lighting

By GEORGE COYLE, Works Engineer
East Springfield Works, Westinghouse Electric Corporation

RAPIDLY INCREASING need for greater plant security and the Federal Government's insistence that all plants producing war goods satisfy the strictest of security requirements, has focused greater attention on lighting, particularly yard lighting. The control of this lighting, for economy and efficiency, is an important adjunct to the lighting itself.

In 1939, a start was made at the East Springfield works of Westinghouse Electric Corp., on a plan to eventually control all yard lighting, and inside guard-patrol lights, by means of electronic controllers and photoelectric cells. The system has been constantly expanded until today 1,000,000 of the plant's 1,311,000 sq ft of floor space is controlled by this method.

Inside guard lights consist of 60 or 100 watt RLM fixtures spaced from 80 ft to 100 ft apart and located along the guards' routes. Additional lights may be installed should new routes be established, or should new areas in the plant become more highly critical.

Floodlights, used in the yards, are of 500 watt, 750 watt, and 1000 watt size; they are mounted on the buildings and project over the area to be lighted. Additional outside lights, consisting of 150 RLM fixtures, are mounted at vestibules, doors, and active night-yard areas.

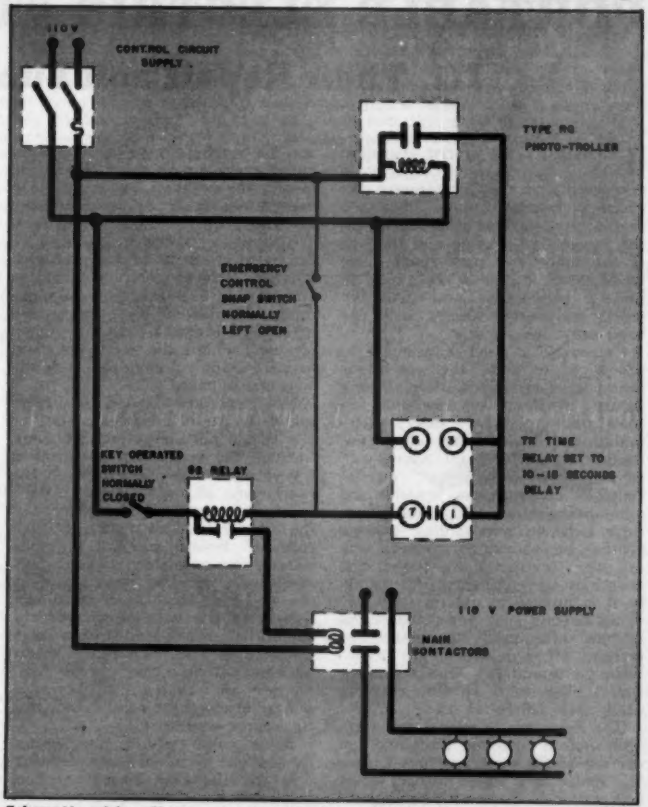
Four electronic controller units control all the yard and inside guard-patrol lights. The electronic controller is mounted behind a window inside the building and about 12 ft above the floor. The electric eye which actuates the controller is directed at the window and they are so located that all of them face eastward. When the intensity of outside lighting diminishes the lights are turned on; the reverse is also true.

The accompanying wiring diagram shows the essential operating equipment used for the control system. Basically, the lights are controlled from a main power contactor or contactors. The electronic controller, actuated by the changing intensity of light, operates the TK relay which, through a small contactor, controls the main power supply contactor to the lights.

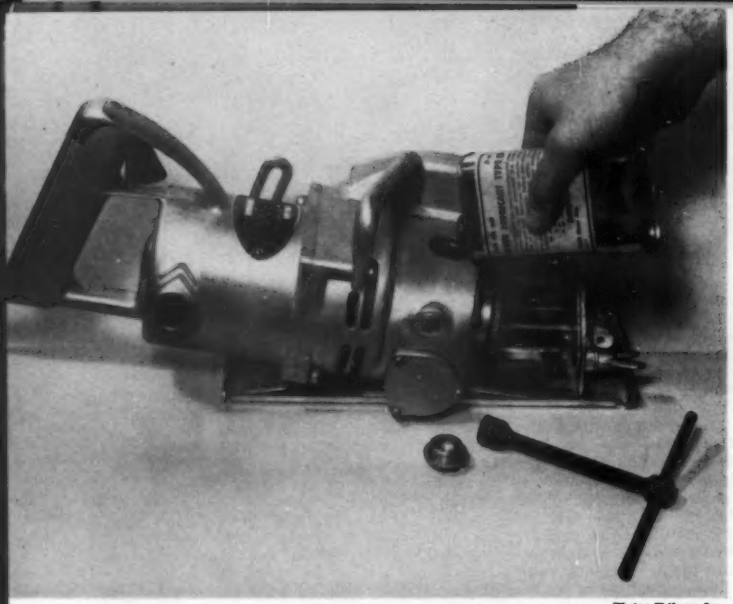
The TK relay prevents unnecessary fluttering of the control contactor when passing cleuds rapidly change the quantity of light entering the photocell. The intermediate Type SG relay keeps the control current from reaching the TK relay contact. An emergency control snap-switch can be closed by the patrolling guard in case of a failure or burn-out of the electronic controller.

When extending the system throughout the plant, it is only necessary to run the control circuit to a power contactor in the new area. In fact, one electronic controller and one TK relay could control the entire yard lighting, and the guard-patrol lighting, in an entire plant. The only reason for additional controls is the long distance between adjoining buildings, in which case it is more economical to install additional controllers than to extend the control circuits.

Advantages of the photoelectric control are fourfold: First, it keeps the lights on only when needed and thus makes for longer lamp life, and less maintenance and replacement. (This factor is probably more important than power savings inasmuch as high-priced labor is involved). Second, it reduces electric power consumption because the lights are on only when they are actually needed. Third, regardless of the length of time of the guard's tour, guard lights are kept on only when needed and guards are relieved of the responsibility of turning lights off and on under varying conditions of daylight. Fourth, electronic controller automatically makes allowances for dark, stormy periods in mornings and evenings.


110 V
CONTROL CIRCUIT SUPPLY
TYPE RG PHOTO-TROLLER
EMERGENCY CONTROL SNAP SWITCH NORMALLY LEFT OPEN
KEY OPERATED SWITCH NORMALLY CLOSED
SG RELAY
TK TIME RELAY SET TO 10-15 SECONDS DELAY
110 V POWER SUPPLY
MAIN CONTACTORS

Schematic wiring diagram for control of guards' lighting system, yard lighting



"Some tools are equipped with gear cases that must be kept filled to a certain level with proper lubricant; others are provided with gear cases utilizing semi-liquid solid greases."

Photo: Skilsaw, Inc.

Dust, dirt and chips are enemies of proper tool operation, therefore, cleaning is a matter of primary importance . . . Standard procedures and special precautions . . . Disassembly for overhauling . . . Use of solvents in cleaning . . . Care of commutators . . . Checking for excessive wear and loose or broken parts . . . Testing cords for breaks and other defects . . . Adequate lubrication

PORTABLE ELECTRIC TOOLS

III. Their Repair and Lubrication

TO INSURE the proper operation of portable electric tools it is necessary that they be cleaned, inspected, repaired and lubricated regularly. Intervals will depend on the severity of service and the age of the tools, and may range from weekly, in the case of tools used in heavy production and assembly work, to yearly, where tools are used only occasionally.

Generally a good barometer to follow is to note the conditions found at each overhauling, basing future overhauling schedules on these findings. Where heavy accumulations of dust and chips are found, where lubricant shows excessive deterioration, or cords, switches, commutators, brushes and other parts show considerable wear, time between overhauling periods should be shortened. Where the opposite conditions are found, the time may be lengthened. But usually it is unwise to extend such periods beyond one year, regardless of how infrequently the equipment is used, since defects might otherwise go unnoticed. One manufacturer suggests a careful checkup after each 200 hr of use.

The first step in caring for portable tools is cleaning. Dust and grit are among the worst enemies of electric tools. They cause bearing wear; lack of ventilation, with consequent overheating and damage to the motor and the bearings; and excessive commutator and brush wear. Since the motor is usually air-cooled, the ventilating air drawn into the motor draws dust and grit in with it. To eliminate as much as possible the harmful effects of dust and grit, it is advisable to clean out such accumulations once a week, under ordinary conditions, and more frequently (once a day or even oftener) where the tools are used in production or in dusty or abrasive atmospheres.

Most tools are cleaned by directing a stream of compressed air, or air from a portable electric blower, through the ventilation openings in the case, first through those in the rear, then through those in the front. This should be done first with the tool idle and then with the tool running. Before running the tool, remove any accessory, such as drill, saw blade, grinding wheel, sanding disc and pad. Deposits of caked dirt lodged in the ventilating openings should be scraped loose with a small screwdriver or penknife, before blowing out the case with compressed air. Be careful, however, not to insert the cleaning tool into the motor enclosure.

Some tools require that special precautions be taken when cleaning. The manufacturer of one type of disc sander advises that the removable top section of the handle be removed and the compressed air stream directed through the motor housing opening and over the motor, while the tool is idle; then with the motor running, again direct the air stream over the motor.

Some tools, such as grinders, are equipped with a felt air filter. This should never be permitted to clog so badly as to cause overheating. Such air filters should be replaced as often as necessary to prevent such a condition.

It is therefore important that the individual tool manufacturer's instructions be followed in cleaning, as well as in all other phases of tool maintenance.

After directing compressed air through the ventilation openings, remove both motor brushes and direct the air stream through each brush holder. If the brushes are in good condition and not worn shorter than ¼ in. to the end of the spring, as shown in Fig. 1, they should be replaced in exactly the same position, and the caps tightened.

At the regular periodic overhaulings, tools should be taken apart for a thorough cleaning, to remove the oil, grease, dirt, carbon dust and copper dust that has accumulated on the stator, brush holders, commutator and other parts. It is very important that such material be removed completely, otherwise the insulation can become damaged,

short-circuits occur, and the motor and wiring burn out.

When disassembling tools use caution to avoid damage, and carefully note the position of each part, so as to be able to replace it correctly. If necessary, a rough sketch should be made for use as a guide in reassembly. If available, the manufacturer's instructions on taking the tool apart should be followed.

Solvents for Cleaning

Use a solvent such as varsol to dissolve all greasy accumulations, so that the parts may be thoroughly cleaned. The motor brushes and springs should be removed while cleaning, to permit the fluid to dissolve greasy deposits from these parts, the brush holders and the commutator. Do not flood solvent on the windings or wiring, or dip these parts into the solvent, as this will damage the insulation. The minimum solvent that will do a good cleaning job is all that should be used.

Clean the chuck (on drills) by flushing or dipping in solvent. After drying, immerse the chuck in light machine oil for a few minutes if the jaws are tight. Otherwise, apply only a few drops of oil to the chuck mechanism.

If any interior wire insulation is worn or damaged, tape it carefully and paint the tape wrapping with shellac.

If the tool motor is equipped with a dust seal to protect the commutator and brushes, this should be scraped clean.

Care of Commutators

Next examine the commutator. This should be smooth and burnished. If it appears to be slightly burned or roughened, it should be lightly sandpapered with a strip of fine grit abrasive paper or cloth. Never use emery paper or cloth as this may cause short-circuits. A fine grit commutator stone, especially made for such applications, may be used instead of abrasive paper or cloth.

Commutators that are badly burned, grooved or roughened require major overhauling. This will be covered in a subsequent installment.

If the motor brushes are found to be shorter than ¼ in. in length, they must be replaced with new ones. New brushes should be obtained from the tool manufacturer, if possible, to insure that they will be the proper type and grade of material. This is very important, as the wrong grade of brush can easily damage the commutator. A brush containing abrasives and intended for use on non-undercut commutators can cause excessive wear of an undercut commutator, while a brush made for use on undercut commutators may cause such poor contact on a non-undercut commutator as to burn the commutator surface severely.

New brushes, whether shaped on the end to fit the curved surface of the commutator or not, should be sandpapered to closely fit the commutator, as shown in Fig. 2. This insures good contact between the brush and the commutator over the full area of brush contact surface, despite any irregularity in brush holder position or slight difference in diameter of the commutator.

Use a very fine grit abrasive. If the brushes require considerable sanding, a coarser grit may be used at first to save time, but a very fine grit should be employed for finishing. This will help insure a better electrical contact between the brush face and the commutator, an important factor in minimizing sparking and heating, and consequent damage to the brushes and commutator.

Checking Springs

Check the condition of the brush pressure springs. If weakened through loss of temper or wear, replace them with new ones furnished by the tool manufacturer. Substitute springs may not possess the correct pressure, and may cause undue brush wear and commutator heating if too strong, or poor brush contact and excessive sparking if too weak.

In installing new brushes, or when replacing brushes that have been removed, be sure they slide freely in the holders, but not so loosely as not to be held firmly in position on the commutator.

Where the brushes are fitted with a wire shunt, this may become sufficiently twisted by rotation of the brush holder cap as to remove spring pressure from the brush, as shown in Fig. 3. It is well, therefore, to twist the shunt a couple of revolutions in the reverse direction before replacing the brush holder cap, so that the rotation of the cap will untwist the shunt and restore it to its full length.

Never place lubricant on the brushes or the commutator unless recommended by the tool manufacturer, and then use only the lubricant suggested. Generally, brushes furnished by the manufacturer possess the lubricating characteristics required for the particular application without the necessity for additional lubrication.

Careful Check Required

Next check over all parts of the tool carefully to discover any excessive wear, broken or loose parts, misalignment, etc. Worn bearings, cracked, bent or broken parts, or other serious defects such as damaged armature or field coils, worn chuck, require major overhauling procedures, and these will be explained in a later installment.

Be sure to check all wire connections, at the plug, the switch, the brush holders and the brushes, as well as the ground wire connections to the tool frame. If the plug contacts are worn, loose, bent or broken and cannot be restored to normal, the plug should be replaced with a new one.

Screws or bolts that have loosened should be tightened; avoid overtightening as this may strip the threads from the tapped holes in the tool parts. Where lock washers or lock nuts are missing, these should be replaced. Do not attempt to substitute screws or bolts having a thread different from the original, or a different length, where such parts are used in tapped holes. Though such substitutions may sometimes be made in the case of

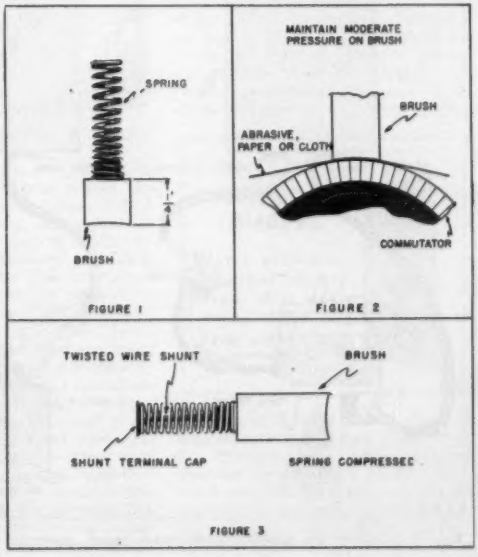


Fig. 1. If the brushes are in good condition, and not worn shorter than ¼ in. to the end of the spring, they should be replaced. Fig. 2. New brushes should be sandpapered to fit the surface of the commutator. Fig. 3. When brushes are fitted with a wire shunt the shunt may become sufficiently twisted by rotation of the brush holder cap to remove the pressure from the brush

through bolts, in emergencies, it is always advisable to obtain, and keep on hand for such use, screws and bolts duplicating those originally used.

Sometimes it may be necessary to use a larger diameter screw, to compensate for worn or stripped threads in a tool part. In such cases, the holes should be re-tapped for the next size thread, but only where this is practical and will not in any way affect the satisfactory performance of the tool. Otherwise it is advisable to procure a replacement part from the manufacturer.

The power cord and switch should next be tested for possible defects. As shown in Fig. 4, an insulation resistance tester, magneto, or bell-ringing set may be used for testing. Connect the line terminal of the tester (or either terminal of the magneto or bell-ringing set) to one contact of the cord plug. Then connect the ground terminal of the tester (or the other terminal of the magneto or bell-ringing set) to the tool frame.

With the tool switch in "on" position, crank the tester and note the reading. To be satisfactory this should be generally at least one megohm. If lower, it usually indicates current leakage due to poor insulation, or the presence of oil, moisture or dust between the current-carrying parts and the tool frame. Some equipment may be satisfactory even though the test reading is less than one megohm, provided that the equipment has been given such tests at regular periods and the readings have remained at a reasonable level, thus showing no progressive reduction. The manufacturer should be consulted as to the proper minimum reading to be obtained.

Next connect the line terminal of the tester to the other plug contact. Again take a reading. This reading, too, should not be below minimum safe resistance.

Then connect the line terminal to the ground terminal of the plug (or to the ground wire where a two-contact plug is used) and again take a reading. This reading should show zero resistance, to be satisfactory. If not, it shows a defective connection in the grounding circuit. This may be due to a broken ground wire, broken or loose plug contact, or loose or corroded connections where the ground wire is connected to the tool frame.

Next check the continuity of the power circuit of the cord, as shown in Fig. 5. (This test is necessary only if the tool motor fails to operate when connected to the power circuit.) If the cord wires are in good condition, each will give a zero reading on the tester. A higher than zero reading indicates an open wire. If the defect can be located, the cord may be cut, the defective section removed, and the cord spliced. But unless the cord is in otherwise good condition, it should be replaced with a new one.

If the test shown in Fig. 5 shows the cord wires good, next test the switch, as shown in Fig. 6. The switch should be in "on" position during this test. Failure to obtain a zero reading indicates a defective switch, whill will require replacement with a new switch. It is not advisable to attempt to repair a defective switch.

Failure of the tool to operate, after the cord and switch test ok, indicates trouble in the motor itself. Tests for motor defects will be treated in a future installment.

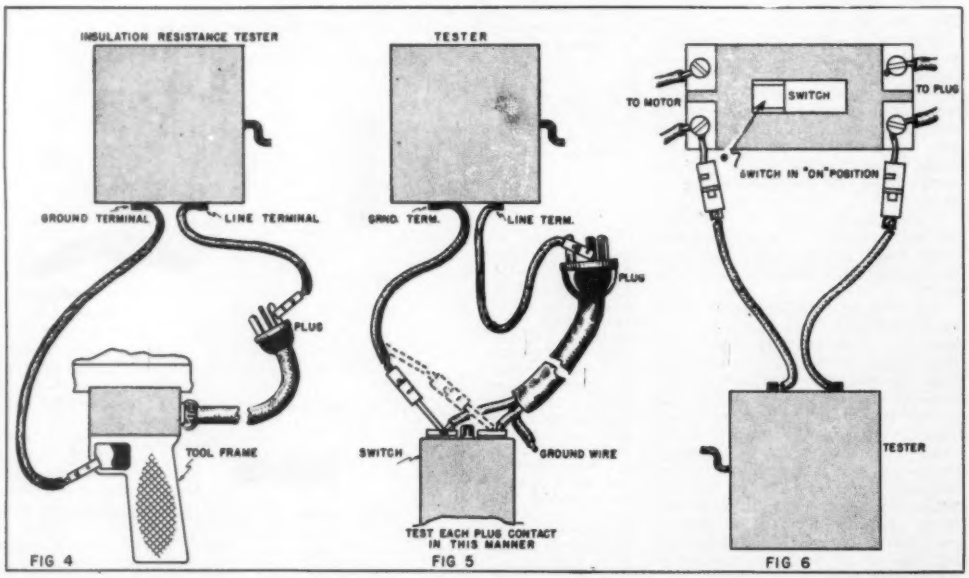
If possible, plugs used on power cords of electric tools should be made of soft rubber, so that they can better withstand the hard service to which such cords are subjected.

When replacing the cord, plug, switch or any other electrical part, be sure the wire connections are well made and tight, no wire ends left without insulation, and all cord and wire strain clamps tightened.

Cords should never be repaired by wrapping defective sections with friction tape. Such parts should be removed from the cord and the cord wires spliced and soldered, and the splices taped with rubber or approved plastic tape, and this tape covered with a layer of friction tape.

One of the most important requirements of portable electric tools is adequate lubrication. This means the proper quantity of correct lubricant, applied at the necessary periodic intervals. Since types and makes of portable tools vary so widely, it is important that the manufacturer's instructions regarding lubrication be followed carefully for each tool. This is necessary, in order to insure satisfactory operation and to assure long life, because the types of lubricants, methods of

(Continued on page 134)



Figs. 4, 5 and 6. An insulation resistance tester, magneto, or bell ringing set may be used to test the tool as shown above

Sprinkler or No Sprinkler? — That's the Question

A. D. Bosch, Secretary of the National Automatic Sprinkler and Fire Control Association, makes pertinent comment in a recent article dealing with records storage centers and their protection against fire

RECENTLY YOU PUBLISHED an article "Planning a New Records Storage Center—Now a Current Problem," by Emmett J. Leahy of the National Records Management Council and Wesley A. Clark of the Atomic Energy Commission. This article starting on page 70 of the March 1951 issue states:

"While emphasizing the need for protection against fire hazard, the center should also be safeguarded against water hazards from sprinkler systems. The center itself should be fireproof so a sprinkler system is superfluous. Even if it were not fireproof, a sprinkler system should not be operating in a records center as experience shows that water is more destructive to records than fire."

Damage and Water Supply

While there may be some water damage from the operation of an automatic sprinkler system, the fact must not be lost sight of that the water damage to records storage would be greater if large hose streams were used. The 1947 report of the National Fire Protection Association on "Protection of Records" very definitely urged the installation of automatic sprinklers despite the possibility of some water damage. It also stated:

"Automatic sprinklers installed in accordance with the NFPA Standards on Sprinkler Equipments are effective in extinguishing or limiting the spread of fire. Where sprinklers are installed, sprinkler alarms and shut-off valves, located conveniently outside the vault, should be provided to permit turning water off promptly after fire is extinguished, thus preventing unnecessary water damage."

H. E. Muir, Chief Research Engineer of the Factory Insurance Association, advised us that their approach has been along these lines. He suggests that before the degree and nature of the fire protection required for records can be estimated, it is necessary to know what hazards they are exposed to by making a survey of the building and its occupancy in each area where records are kept. The assistance of a capable fire or record protection engineer in making and interpreting such survey is recommended.

Recently we had a sorry example of the use of "too much water" in the un-sprinklered State Office Building at Lansing, Michigan. It required 4,960,000 gal. of water to control this fire. Total loss including invaluable records and historical documents was estimated at $8,000,000! Had the State Fire Marshal's recommendation of 6 yr ago been followed, the fire would have been promptly extinguished by automatic sprinklers. One automatic sprinkler used only 20 to 25 gal. of water per minute as against 250 gal. from a hose stream at normal pressure.

As for the fallacious reasoning that a sprinkler system is superfluous in a "fireproof" center—the word "fireproof" is a misnomer and is no longer used by the insurance industry. Instead the term "fire-resistant" applies to such construction which may be likened to a stove whose contents will burn. After the disastrous fire in the fire-resistant office building of the C. B. & Q. R. R. Co. at Chicago in 1922, H. P. Weaver, a well-known insurance engineer, proved by research that it would cost his client $3,780,000 to replace their records. Proper protection was immediately provided.

In an article, "How Fire-Safe Is a Fireproof Building," in Engineering News Records, John J. Ahern, Director of the Department of Fire Protection and Safety Engineering of the Illinois Institute of Technology, said: "Of all the equipment devised by man to protect himself against fire, none has equalled the record compiled in the case of the automatic sprinklers. They provide a constant control factor ready to leap into action at any hour of the day or night. In existing buildings, they can be utilized to protect stairways, corridors and areas containing combustible material. Used in this way, they greatly reduce the possibility of loss of life.."

Illustrations shown are some of the posters used by the National Fire Prevention Association of the precautions that should be taken to prevent fires.

Rx for Bathing

1. Use Chemicals Specified in Article
2. Clear Boiler of Miscellaneous Trash
3. Fill Up the Boiler and Then Fire It
4. Blow It Down Hourly and Test Alkalinity
5. Reduce Pressure in Order to Flash Steam

By EDWARD S. STEWART, Hall Laboratories, Inc.

BEFORE THEY are put into operation, new boilers require thorough cleaning. Marine boilers, in particular, are often coated with protective paint that has to be removed prior to dock trials. Old boilers which have been dirtied by oily feed water are not fit for service and must be cleaned. Steam of poor quality, reduced boiler efficiency, maintenance difficulties, and possible loss of boiler tubes are the result of failure to clean a new boiler thoroughly and keep it that way.

Old cleaning methods have not proved entirely satisfactory. The alkaline detergents commonly employed may precipitate sludges which merely increase the foreign matter in a boiler. Quite often, water - insoluble grease smears interfere with the cleansing process and render it totally ineffective. Results are unpredictable. Sometimes several cleanings are required to do a job, causing loss of time and waste of chemicals.

"Effect flushing of all surfaces . . ."

One disadvantage with ordinary alkali cleaning methods is the time consumed, usually many hours and sometimes even days. Other work on the boiler must be delayed accordingly. These shortcomings of the older procedures press the need for a faster, more thorough method of boiler cleaning. Cleaning with Calgonite, a high-powered alkaline commercial detergent, has been demonstrated in a large number of boiler plants to be an effective improvement over older methods.

For each 1,000 pounds of water required in filling the boiler to its normal operating water level, use:

Calgonite	3 lb
Caustic Soda	0.25 lb
(Or Caustic Potash 0.85 lb.)	
Wetting Agent	0.25 lb
Sodium Nitrate	0.25 lb

For small, low pressure boilers, when the water storage capacity is not known, chemical requirements may be based on horsepower. For each 100 boiler horsepower, use:

Calgonite	15 lb
Caustic Soda	3 lb
Wetting Agent	1.25 lb
Sodium Nitrate	1.25 lb

All of the required materials are readily available commercially. Any one of the new soap-free detergents now available in grocery stores can be used as the wetting agent.

In case of a new boiler installation, of course, the cleaning process must not be started until the boiler has been carefully cleared of tools, rags, miscellaneous iron or trash, or any other debris which may have accumulated in the boiler during its erection. The necessary hydrostatic tests must have been completed, and all vents, drains, and blowdown valves must be in working order. A principal requirement is the use of sufficient Calgonite and the other chemicals to assure that: one — all calcium present in the water and on the boiler surfaces is precipitated as calcium phosphate, two—all magnesium is precipitated as magnesium silicate, three—all oil is saponified or dispersed, and all dirt and sludge is dispersed, and four—an alkalinity of at least 275 ppm (as sodium hydroxide) is maintained during the boiling out process. Another important requirement is that the cleaning solution be circulated sufficiently to effect thorough flushing of all surfaces, including those surfaces normally above water level.

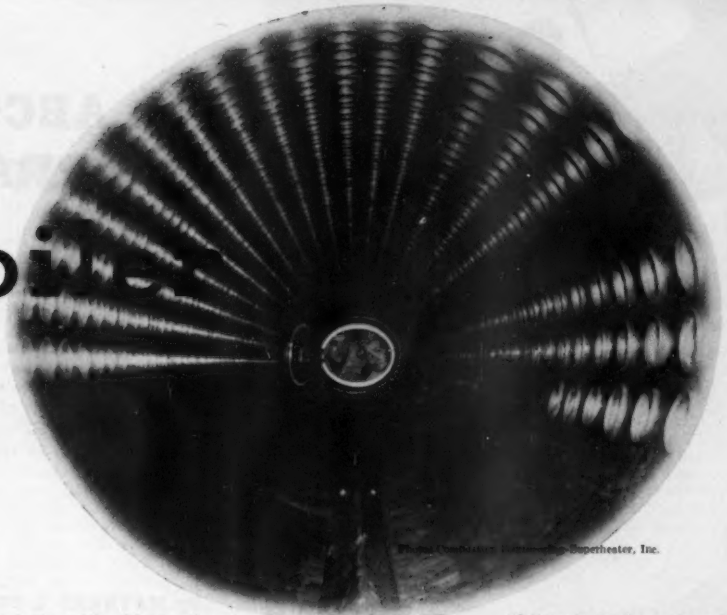
The required materials are first dissolved in water, using at least 1 gallon of water (preferably hot) per pound of chemical. As a safety precaution, the operators who do this work should wear goggles and rubber gloves. Chemical solution is introduced into the boiler in any convenient manner; it may be poured through a manhole; added by means of a chemical feed pump if one is available; or injected into the suction side of the boiler feed pump while the boiler is being filled. If an economizer is involved, the chemical solution must be added through it.

"Better circulation obtained at higher temperatures."

The boiler is then filled to the middle of the gauge glass, preferably with hard, raw water, is closed up and fired lightly to bring the pressure to not less than 25 psi, and is boiled for a minimum of 12 hr. Better circulation is obtained at higher temperatures, and the pressure may be increased to the operating pressure of the boiler. Little is gained by going higher than 300 psi.

When the boiler is up to pressure,

a Boi



each blowdown connection should be opened for a short blow, and this short blow repeated at hourly intervals. The blow down water should be scalding hot; if it is not, several short blows should be made until the temperature of the water increases. If the side wall tubes are not hot, it is an indication that the circulation is poor and that the pressure should be raised. During this period, the boiler water level should be maintained at 1/3 gauge glass by addition of fresh water from time to time.

Alkalinity Tested Hourly

Titrations are made on boiler water samples each hour to determine whether the recommended caustic alkalinity of 275 ppm is being maintained. The gauge glass or other sampling connection is thoroughly flushed before the sample is withdrawn. The titration technique is to add 10 ml of netural barium chloride solution (10 per cent $BaCl_2$) to 100 ml of sample, add phenolphthalein indicator, and titrate with N/30 acid until the pink coloration disappears. Multiplication by 13.3 of the milliliter of acid used in the titration will give the alkalinity as ppm sodium hydroxide. If the alkalinity drops below 275 ppm, caustic soda must be added. If necessary, the pressure may be relieved and the caustic soda added through a manhole.

At the end of the 12 hr run, the pressure may be relieved through the safety valve or other convenient steam outlet. Steam flashed by this rapid reduction of pressure will circulate solution rapidly through all parts of the boiler. This pressure reduction should not be too rapid or foaming may take place. When atmospheric pressure is reached, the manholes should be opened and the boiler drained. A thorough flushing with fresh water follows, with the steam circulator tubes and other surfaces normally above the water level being washed with a hose.

Boiler operators report that a single boil-out following this procedure has produced excellent results. If the surfaces are not satisfactorily clean after one boil-out, it must be repeated.

In the event that the boiler operating pressure is over 900 psi, the feed water is mainly condensate, or the steam is used in turbines in which the steam pressure drops below 550 F., it is advisable to follow the Calgonite cleaning with an alkali boil-out.

This is done by filling the boiler with water, adding 0.3 lb NaOH and 0.1 lb $NaNO_3$ per 1,000 lb of water, firing to raise pressure enough to promote thorough circulation, and boiling for at least 12 hr. Hourly alkali determinations should be made, and the caustic concentration kept above 150 ppm (as NaOH). If it is necessary to add caustic soda to increase the caustic concentration, 0.1 lb of sodium nitrate should be added for each 0.3 lb of caustic soda. After this boiling out, the pressure should be reduced to atmospheric, and the boiler flushed as before.

"Relieve the pressure through the safety valve."

If it is desired to use caustic potash (KOH) rather than caustic soda (NaOH) to maintain the caustic alkalinity, 0.85 lb KOH per 1,000 lb of water should be used. There is some evidence to prove that caustic potash will produce better results, but the evidence is not conclusive.

The procedure described is general in nature and may need to be modified to meet the individual plant conditions. For this reason, it is desirable to have the cleaning done under the supervision, or at least the advice of, an engineer familiar with water-conditioning chemistry.

GENERAL MOTORS recently opened to the press the office, shop and dynamometer buildings of its Engineering Staff at the new GM Technical Center north of Detroit at Mound and Twelve Mile roads.

Engineering Staff, headed by Vice President Charles A. Chayne, occupies the first of five building groups on the 813-acre site. Eventually the area will contain GM's Research Laboratories Division, Process Development Section, Styling Section and a Service Center.

The over-all Technical Center project is expected to be completed in the next two or three years, giving General Motors the largest and most comprehensive facility of its kind in the automotive industry.

At this time the entire project is from 35 to 40 per cent completed. Now operating, in addition to Engineering Staff buildings, are the main power house, several small utility buildings and the gate houses.

Meanwhile the Metallurgy building will be completed in the near future.

The ABC's of PRACTICAL

Just a few cautions and precautions to observe in any maintenance setup . . . importance of lubrication and correct attitude of management . . . Electrical Maintenance . . . Maintenance of valves and piping

By MAYNARD L. EVANS,
Maintenance Department
Golden State Milk Co., Ltd.
Los Angeles

SOUND APPLICATION of good common sense is the basis of any preventive maintenance program. There is nothing more to it and it doesn't make a particle of difference whether it is used in a small or in a large plant. Preventive maintenance means dollars saved and, in any kind of plant, a buck is still a buck.

A piece of raw, untreated lumber, if left exposed to the elements, will in a short time warp or crack. After that, paint, planing, sawing and hammering will not bring it back to serviceable condition. Yet, that same lumber, properly treated, would have given years of useful service, plus additional years of service by throwing in an occasional coat of paint or creosote. You already know this! Then, read on for a few paragraphs and you may find an answer to a few things that are not so obvious.

Applied preventive maintenance is the same whether the equipment be large or small, simple or involved. Manufacturers furnish service manuals. If the manuals are read thoroughly one will find they deal almost entirely with the prevention of various types of failures. The reason is obvious: manufacturers are definitely interested in satisfying you as a customer. To do that, they want you to get a maximum amount of satisfactory service at a minimum expenditure.

The last few years have found the manufacturers standardizing their equipment more and more thus making it possible to apply similar programs of lubrication, adjustment and operation in all plants with similar activities. The maintenance departments thus have almost identical headaches to overcome, and the most intense is proper lubrication.

Lubrication

Too many motors and pumps have been discarded due to grease-happy mechanics doing double-time with an oil can or grease gun.

Select the lubeman with a few sensible points in mind such as: Does he know the various types of bearings and bearing surfaces, cams and their actions, variable sheaves, pump speeds? Is he willing to learn? If he doesn't know what is inside the gear boxes, will he be conscientious enough to study the manuals and find out? Will the department head keep him posted on the reasons certain types and brands of lubricants are used in preference to others?

Here is a must: Would someone of importance in the department please listen to the lubeman once in a while? Because, if he is a well-trained mechanic, and he should be, that man in making his rounds periodically gets to know the equipment and can tell by sound or feel when something should be checked minutely to avoid minor failures and break-downs which are always costly in parts, labor and lost time.

In too many cases this all-important job is dropped in the lap of a helper or apprentice. He is automatically called the grease-monkey. He gets the job whether he likes it or not, and he also gets the blame either directly or indirectly for most of the troubles. He has to take it if he wants to eventually work up to mechanic and eat three squares a day while he is in the working-up process.

Will management be kind enough to consult the maintenance department early when being high-pressured by some sales representative seeking to place a new product on the market or trying to substitute a cheaper brand of lubricant for one that has already proven itself to be satisfactory? Preventive measures start at the top as well as at the bottom.

Perhaps you have been wondering

PREVENTIVE MAINTENANCE

lately why you have had so many electrical troubles. Why don't we eliminate most of them by having a competent man periodically check the panel boards to see if the connections stay tight or if the contact points are fouling, causing the magnetic starters to single-phase or spasmodically kick out? Control boxes do collect moisture, deteriorating even the best of insulation, also causing rust and corrosion. A corroded or worn 35 cent tumbler light switch can cost you hours of delay. Here is an example: Maintenance gets a call from the warehouse, filling room or the offices, that a half dozen employees are standing around in the dark. The mechanic checks the fuse board. It is O.K. So back he goes hoping there is no short in the conduit. Out comes the tumbler switch to find it worn, corroded or cracked.

More Lost Time

Down he goes to get a replacement, hoping there's one in stock. If not, there's additional time lost in repair. The total result is the lost time of six or seven employees plus perhaps a hold-up of other departments down the line. Rather expensive when it happens several times a year. The repair man did an efficient job, but an established checking system would have eliminated those lost man-hours.

Do you know that the best time to clean the dust and dirt out of your electric motors is before it gets the opportunity to unite with oil, grease or water? Sure you do, but do you do it? Your repair bills spell the answer. Don't let water, grease, oil or dust get to the critical section of those motors. A periodical checking system keeps them out. While you are at it also check the alignment—the mechanic who last worked on the motor or the drive may have been a little careless. Once a misalignment starts, the battle is on as to which goes out the quickest —motor, drive or machine. They are all costly to repair or replace.

Evils of Misalignment

Here are a few ills misalignment can cause. Vibration, shakes the motor parts and electrical connections loose, causes hold-down bolts to work loose and allows additional misalignment, thus putting more strain on the shaft. There goes your bearings. In the meanwhile, how many belts went into the trash can, or maybe it was a coupling that was ruined? All this still did not help the overload the motor was carrying.

Certainly surprising when you give out with a little thought. Here we are again using our common sense, and it tells us maybe this periodical check-up stuff is all right after all. Perhaps a little of this preventive maintenance can get the old plant back on her foundation again.

Valves and Piping

Of equal importance in a PM program is the prevention of valve failures; that means proper corrections before damage occurs. This in itself means economy to the plant management at a time when maintenance costs are rising daily.

Valve installation is simple but important. The pipe must be clean and properly threaded. The pipe must be supported properly.

Globe valves normally must have the inlet pressure beneath the seat. This permits packing under pressure. The disc and seat depend on the fluid to be controlled. The spindle, if at all possible, should be in an upright position, otherwise the bonnet may act as a trap for foreign material, eventually clogging and retarding the action of the valve. That is one reason for removing the bonnet for cleaning periodically. While doing so, the packing can be replaced and the seat reground or touched up, thus preventing wire cutting or drawing which is the major failure in the globe type valve.

Value Your Valves

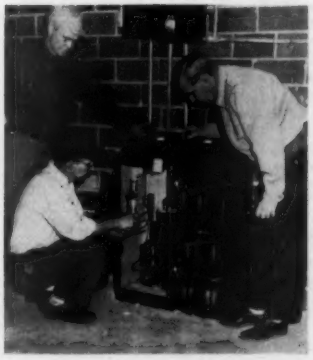
This is an excellent time to remind the mechanic that the wheel on the spindle is to be hand-operated—and not with a "persuader." The persuader is a good method of putting a valve beyond repair, such as bending, breaking, stretching or stripping the spindle. A little extra leverage on a wheel can very easily build up several hundred or even several thousand pounds pressure.

Let's get back to the term "wire cutting," and by using some rough figures surprise ourselves by the quantity of water wasted by such valve failure. An opening the size of a pin hole is good for an estimated 170 gal. in 24 hours. An opening the diameter of a wooden match can put approximately 600 gal. down your drain in a day and night. The city of New York loses in the neighborhood of 100,000,000 gal. per 24 hours because of wire cuts. How much is your plant paying for wasted water these days?

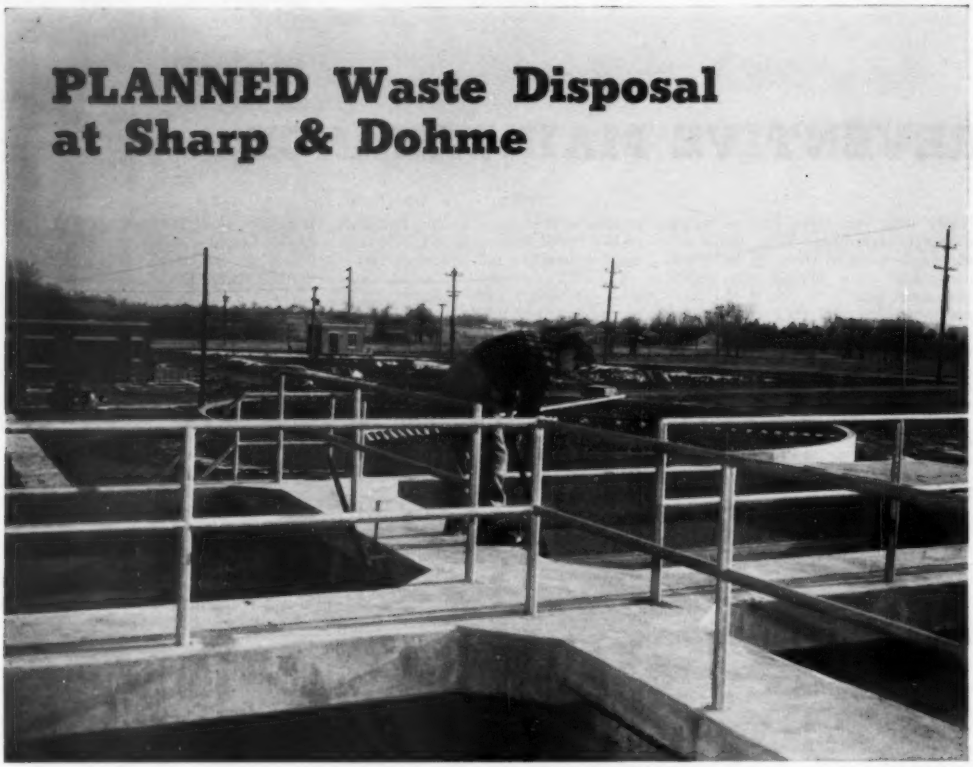
Here is a little something on gate valves that might be beneficial in cutting costs. By checking with the manufacturers' engineering advisory services, one discovers that a gate valve is not intended for throttling purposes, they aren't constructed to regulate flow, but to be used wide open or completely secured.

Perhaps by now preventive maintenance may seem more important than it was a few minutes ago. If not, we can go further and take on some centrifugal pump problems, or maybe your V belt department is acting up and getting out of hand. But we would be taking up more of each other's time. So in closing here is a little thought to keep in mind. A systematic periodic check by the maintenance department will pay management good sound dividends in more ways than one, and that, I believe is your reason for being in business. You are entitled to reliable performance and stability of operation. Are you getting it?

The author, Maynard L. Evans, is a working craftsman and a good one. There are many ills inherent in the very name of maintenance and most likely many of these are seen in sharper focus by the man on the job than by others not so closely connected to the work. This is proved by the millions of dollars worth of suggestions received from employees every year by American industry. Read the article and see if you agree.—The Editors.



PLANNED Waste Disposal at Sharp & Dohme



By J. W. FOX, Waste Disposal Engineer, Sharp & Dohme, Inc., Philadelphia

SHARP & DOHME, Inc., well-known manufacturers of pharmaceuticals and biologicals and long-time residents of Philadelphia, recently constructed a new plant in West Point, Pa. In order to adhere to the anti-pollution laws, both moral and written, it was decided that a treatment plant for all domestic and industrial wastes was in the first order of business.

This waste treatment plant was designed to take care of all units in existence or under construction for the current program. This included the main warehouse building, the fermentation unit, boiler room, synthetics building, research laboratory, unit process building, and the plasma processing laboratories. The pump and control building structure and most of the underground piping were designed for the estimated future requirements of the company at the West Point site.

The loadings on which the design of the plant was based are:

Flow	**110,000 Gal per day**
Biochemical Oxygen Demand	**1,450 ppm**
Suspended Solids, Domestic & Biological	**220 ppm**
Population Equivalent	**8,000 people**

The waste treatment unit is essentially a two-stage, high rate trickling filter installation, preceded by chemical treatment of certain industrial wastes, followed by intermittent sand filtration and chlorination, and without sludge digestion.

Throughout the plant, there are three sewer systems, one for storm and cooling water, one for domestic sewage, and one for industrial waste. Storm water does not pass through the waste treatment unit, but goes directly to the stream by several routes. The domestic sewage consists primarily of wastes from lavatories, washrooms, and lockers, but in many cases, other wastes of types amenable to biological treatment are connected to this system. The industrial waste sewers, as their name implies, collect industrial wastes.

The industrial waste sewers and the domestic waste sewers are separated inside the building and join at a point at least five feet outside the building. In some cases where the industrial wastes are amenable to biological treatment, they then combine. In other cases, particularly in the wastes from the synthetics building, the sewer systems feed separately to the treatment unit.

The two systems have been separately provided to make for more flexible installation and operation; if a new product or process requires special pre-treatment or treatment, this is more easily possible because of the separate systems. It is obviously more economical to provide such an installation initially, than to attempt to modify an existing single sewer system laid in or under a building floor.

Industrial wastes from the synthetics building receive a pre-treatment. The wastes are received in two 9,000 gal acid-bricked tanks where they are equalized. The acidity is neutralized and any heavy metals are precipitated by batch treatment with lime. Resulting slurry is then pumped to sludge lagoons for settling.

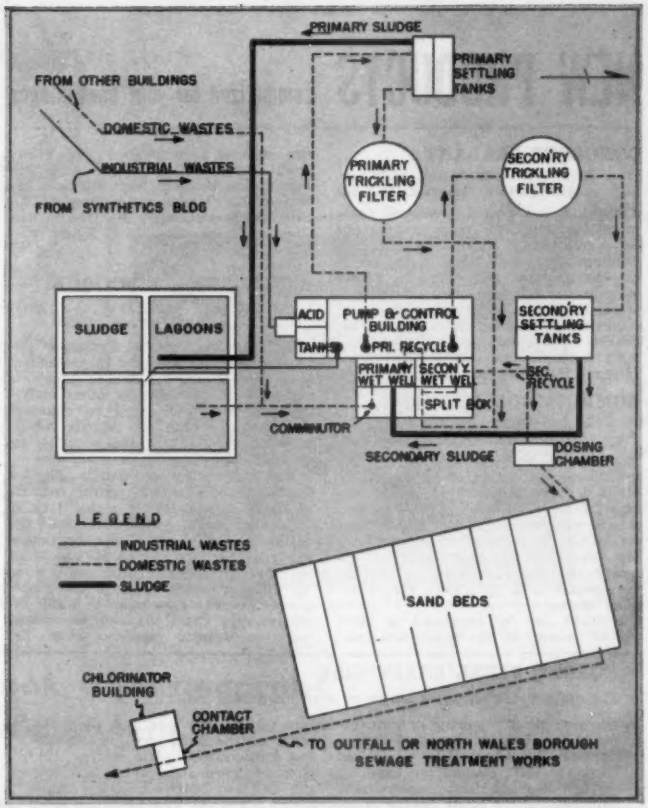
Supernatant from the lagoon is decanted into the main plant inflow of domestic and biologically-treatable industrial wastes. The lagoon supernatant is the chief contributor of the high bio-chemical oxygen demand of the plant, and it might be said that the other wastes are used to feed and seed the bacteria necessary for the oxidation job.

The combined influent then flows

through a comminutor or bar-screen by-pass to the primary wet well. This waste is pumped continuously to the primary settling tank from which the overflow passes by gravity to the 80 ft diameter primary trickling filter. A portion of the filter effluent is returned to the primary wet well as recycle and the remainder passes to the secondary wet well.

Next, the waste is pumped to the secondary trickling filter, from which the effluent passes by gravity to the secondary settling tanks. A portion of the settled effluent is returned to the secondary wet well as recycle, and the remainder passes to an alternating siphon dosing chamber which intermittently doses the sand filter beds. Underflow from the sand filter flows through a chlorine contact chamber and then to the stream.

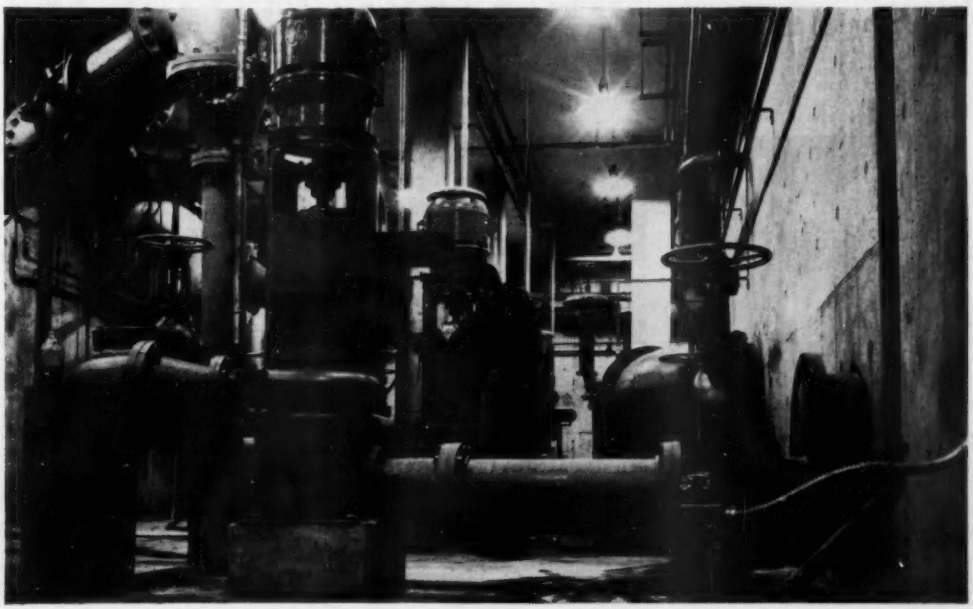
Sludge from the secondary settling tanks is drawn to the primary wet well. Sludge from the primary settling tanks can be drawn by gravity to the lagoons, or pumped by the same pumps which handle the chemical wastes slurry to the lagoons. This procedure is intended to "Kill" the raw sewage sludge by the high concentration of chemical sludge.



Author Joseph Fox adjusts a skimmer on a 10 ft settling tank (photo, opposite page). In the background is a trickling filter, 80 ft in diameter, where the waste material is biologically oxidized

Right: Schematic flow diagram of the waste treatment plant at Sharp & Dohme, Inc.'s, new West Point plant

Below: Mr. Fox checks a bearing on one of the pumps in the main building of the company's waste treatment plant



NEW PRODUCTS summarized for your convenience

CONCRETE SEALANT

Is resistant to water, salts, organic solvents, some alkalis, acids

Ampreg E is a newly developed thermosetting synthetic resin impregnant for application to concrete and porous castings. It can be applied by brush or dip methods and forms a room-temperature-curing sealant. Ampreg E is also said to offer good resistance to oxidizing materials such as chlorine dioxide and sodium hypochlorite. Bulletin 5-60A gives details. The Atlas Mineral Products Co., Mertztown, Pa.

COMBINATION BURNER

Is designed for control to the fire under all atmospheric conditions

Five Hev-E Burners are offered for use where utilization of either gas or oil is desired. Advantages of the new line include a forced air draft system which provides a single blower fan for all air for combustion to give perfect control to the fire under all atmospheric conditions. Both gas and air are controlled to give high CO_2, company states.

Burners can be regulated to burn proper amount of gas or oil, and low-fire start is accomplished with either fuel. On the two larger sizes full modulation between high and low fire is available. Models range from 720,000 to 8,700,000 maximum Btu gas burned. Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis.

SIGNALLING TECHNIQUE

Utilizes ¼ in. tabs that move vertically in plastic jacket

The Multi-Flash Signal System is designed primarily to serve in production and control records where order of sequence of assembly or other activity does not lend itself to standard "bar chart" type of signals which move horizontally across a numerical or alphabetical scale or chart.

For use with company's Kardex visible margin index control records, Multi-Flash consists of signal tabs in a plastic casing which fits over the visible margin of the production record card. These tabs can be all one color or different shades. Positioning is done by using a pencil to move the signal down to cover a number or letter on the margin chart. It can be moved back to neutral position when the process it signals is completed and another is to take its place.

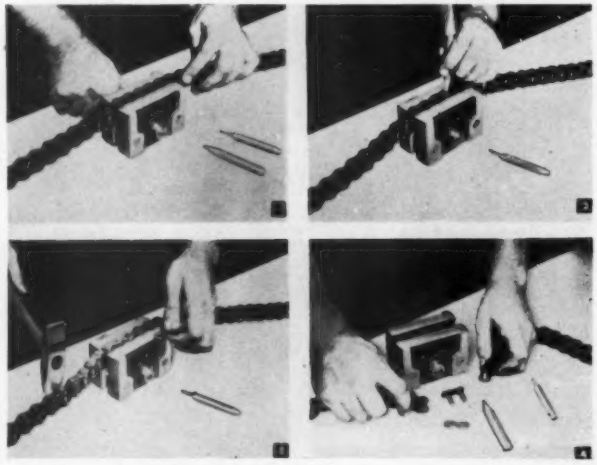
As each department's operation is completed the signal is moved down over the next department number. When there is generally a time lapse between operations along the production line, a second margin chart or scale and a second jacket of signals may be added. Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y.

FORGED STEEL CHAIN VISE

For quickly taking apart single or multiple strand roller chain

Disassembling, repairing or connecting roller chain is simplified by the Baldwin-Rex Chain Vise, which has hardened jaws shaped for adapting to various chain sizes. Approximate adjustments are made before chain is inserted to permit rapid clamping. To cut chain you determine number of pitches required and measure the total length to be cut from the reel. Place the chain in the vise and tighten it, being sure vise is closed sufficiently to hold rollers firmly (1). With a blunt-end punch and hammer, strike one pin and then the other on the same pin link, repeating until outside plate is free (2). Remove freed side plate (3). Now pin link can be removed, the chain taken out of the vise (4).

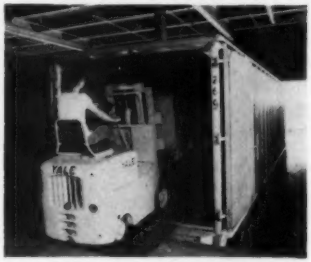
This tool makes it practical as well as economical to stock roller chain in standard lengths. The vise comes in two sizes. Additional details are available from manufacturer. Dept. PR, Baldwin-Duckworth Div., Chain Belt Co., 369 Plainfield St., Springfield, Mass.



GASOLINE FORK TRUCKS

For operation in and around highway motor trucks and freight cars

The Trucker series of fork trucks is designed to combine low weight, short length, low over-all height and high maneuverability for operation in close quarters. Available in capacities to 200 lb, the Trucker is only 68 in. high with telescopic lift collapsed. In duplex models the truck can elevate its forks 54 in. before secondary channels rise to increase the height, company points out, and this permits two high stacking inside street truck bodies.



Controls are automotive type and hydraulic brakes also follow automotive practice. Full information on the Trucker is supplied in Bulletins 1306-11. The Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa.

LIGHT SOURCE

Is 400-w fluorescent mercury vapor lamp, for industrial use

The basically new J-H1 M Lamp is designed to give a whiter light from a mercury-vapor source. Its bulb has an inside coat of phosphor that fluoresces red when activated by invisible ultraviolet light generated by the quartz arc. This tends to balance the spectrum to provide a light that is white enough for industrial purposes.

The new lamp will burn in any position, company states, and can be used in existing fixtures for 400-w mercury lamps. Lower brightness of the J-H1 makes operation at lower mounting heights practical, company says, and increased fixture efficiency is obtained by removing the diffusing shield.

Electrically similar to company's A-H1 and E-H1 types the new J-H1 will operate from H-1 ballasts. For outdoor use, fixtures should be enclosed. Lamp Division, Westinghouse Electric Corp., Bloomfield, N. J.

ELECTRICAL INSULATION

Asbestos base, silicone treated, for high temperature use

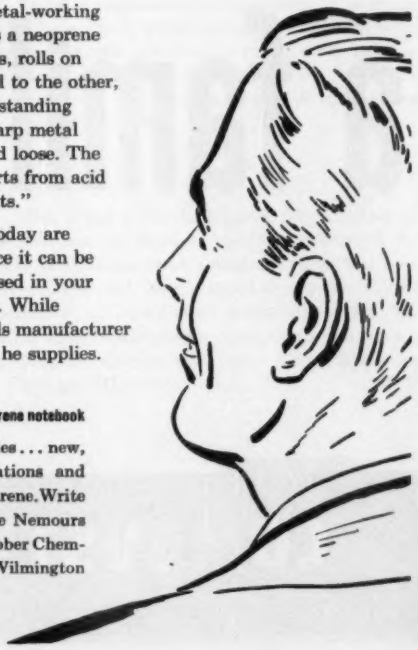
Quinterra Type 3 is a Class H insulation (AIEE Standard) for service at 180 C. It is used for both inter-layer and wire wrapping insulation and is

(Continued on page 112)

"And look what neoprene does for this magnetic sweeper"...

"This magnetic tool, designed for fast, efficient floor cleaning in metal-working plants, makes excellent use of neoprene's unusual properties. It has a neoprene handle-grip, and its aluminum tube, containing four Alnico magnets, rolls on neoprene wheels. A neoprene wiper ring, when pushed from one end to the other, clears the surface of the tube of picked-up parts. Neoprene has outstanding resistance to the scuffing and cutting punishment dished out by sharp metal scrap. And neoprene's resilience prevents the load from being jarred loose. The tool can be used on greasy, oily floors or even to retrieve metal parts from acid and alkali baths because neoprene resists all these destructive agents."

Many resilient parts and products in strenuous industrial service today are more efficient and durable because they are made of neoprene. Since it can be compounded to resist so many deteriorating influences, neoprene used in your plant or product will mean longer life . . . lower maintenance costs. While Du Pont makes no finished products of neoprene, your rubber goods manufacturer or distributor will be glad to tell you about the neoprene products he supplies.



NEOPRENE

The rubber made by Du Pont since 1932

DU PONT

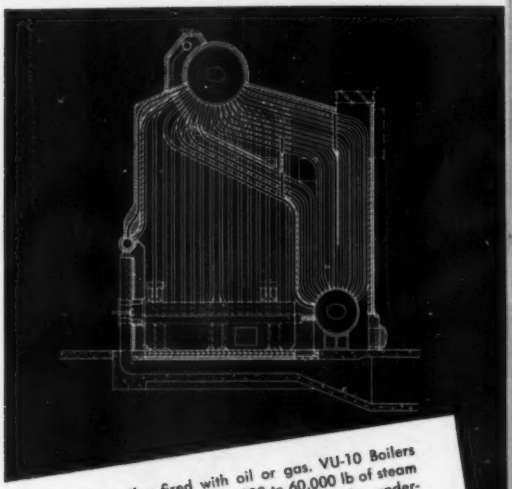
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

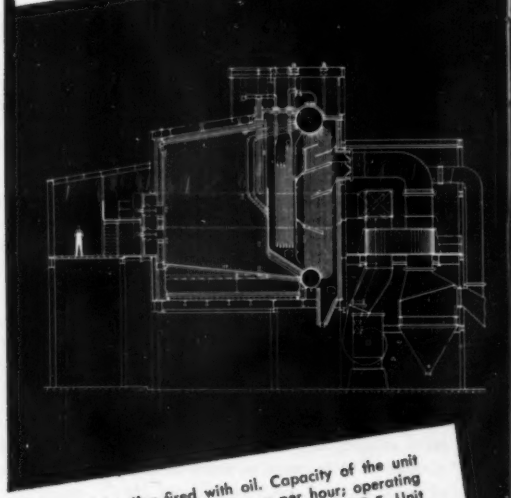
FREE! **The neoprene notebook**

Interesting stories . . . new, unusual applications and products of neoprene. Write E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Div. M-10, Wilmington 98, Delaware.

One VU can start a family



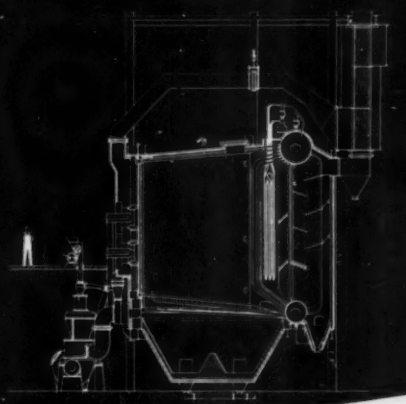
VU-10 Boiler fired with oil or gas. VU-10 Boilers range in capacity from 10,000 to 60,000 lb of steam per hour. They may also be fired by spreader, underfeed or chain grate stokers.



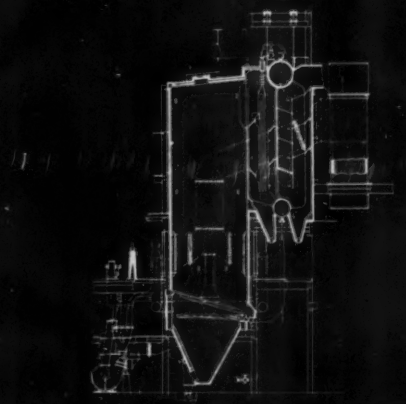
VU-50 Boiler fired with oil. Capacity of the unit shown is 235,000 lb of steam per hour; operating pressure—920 psi; steam temperature—905 F. Unit arranged for future pulverized coal firing if desired.

COMBUSTION ENGINEERING

ALL TYPES OF BOILERS, FURNACES, PULVERIZED FUEL SYSTEMS AND STOKERS; ALSO SUPERHEATERS, ECONOMIZERS AND AIR HEATERS



VU-50 Boiler fired with pulverized coal. The capacity of the unit shown is 60,000 lb of steam per hour; operating pressure—410 psi; steam temperature—700 F. Unit uses oil as an alternate fuel.



VU-50 Boiler tangentially fired with pulverized coal and/or blast furnace gas. Capacity of unit shown—125,000 lb of steam per hour; operating pressure—850 psi; steam temperature—750 F.

With fuel costing what it does today, it is more important than ever before to select a boiler that will assure the most efficient performance possible. That is why so many companies who watch steam costs closely have acquired sizable families of Vertical Unit Boilers. For example:

A Chemical Company ordered two VU Boilers in 1939. In 1946 five more were ordered for three of their other plants. In 1949 another was ordered for one of these same plants, and in 1950 two more units for a fifth plant. In 1951 three more units were ordered for still another plant — thirteen units for six plants in twelve years!

An Electric Utility Company ordered its first VU in 1941. In 1945 it ordered a second VU for a different plant. For another of its plants one unit was installed in 1946 and two more in 1947. In 1949 a VU was installed in a fourth plant, and in 1950 one was installed in a fifth plant. A total of seven boilers in five different plants.

A Sugar Company ordered two VU Boilers for one of its plants before the war. In 1946 it ordered a VU for a second plant. And in 1950 another VU was installed in this same plant.

A Steel Company now has a total of fourteen VU Boilers in four different plants. Starting with an installation of two units in the early thirties, it has reordered six times. The most recent installation of two units at one of its plants was completed in 1948.

* * *

This is just a small sample of the hundreds of companies that have ordered and *reordered* the VU Unit. They have found *through their own experience* that the advanced design, sound construction and consistent reliability of the VU Unit mean *lower steam costs.* Once you have a VU in service you soon know why it is that so often *one* VU starts a family. B-494

— SUPERHEATER, INC.

200 MADISON AVENUE, NEW YORK 16, N. Y.

C-E

triple-threat to trouble!

A PROBE TYPE VACUUM TUBE VOLTMETER

As an a-c probe type vacuum tube voltmeter, ranges of 3 to 300 volts, frequency coverage extends from 50 cycles to 300 megacycles. Specially designed RF and D-C probes supplied.

AN ELECTRONIC VOLT-OHMMETER

Using 115 volts, 60 cycle external power, Model 769 is a stable electronic instrument providing 6 ranges from 3 to 1200 volts d-c full scale and 6 ohmmeter ranges to 2000 megohms full scale.

A VOLT-OHM-MILLIAMMETER

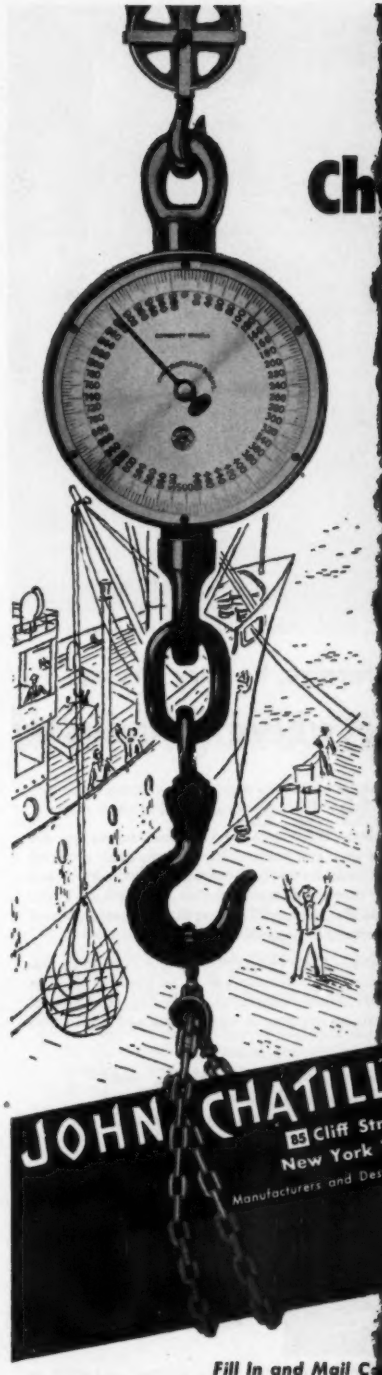
With self-contained power source, provides 6 d-c voltage ranges (10,000 ohms per volt)—6 a-c rectifier type voltage ranges (1,000 ohms per volt)—6 d-c current ranges and 3 ohmmeter ranges.

WESTON model 769

ULTRA HIGH FREQUENCY ELECTRONIC ANALYZER

Here is a truly versatile, three-in-one instrument that's a natural for those engaged in electronics production or maintenance. The entire instrument is protected from external RF influences. Its broad range and its complete stability make it ideally suited for AM, FM, and television testing, as well as for many applications in the HF and VHF fields. Uses standard commercial tubes, replaceable without recalibration. Extremely compact, Model 769 provides greater economy, greater convenience, because this one instrument provides for practically all electronic measurements. Literature available . . . WESTON Electrical Instrument Corporation, 624 Frelinghuysen Avenue, Newark 5, New Jersey . . . manufacturers of Weston and TAGliabue instruments.

WESTON *Instruments*



Chatillon Crane Scales

are engineered for faithfully accurate heavy duty weighing!

These remarkable spring-type, direct reading and large capacity Chatillon Crane Scales are engineered to withstand rugged service that would ruin other types of weighing apparatus.

Built for 1,000 to 10,000 capacities, each scale is equipped with two special alloy steel springs, precision calibrated and designed for maximum safety. Virtually indestructible, every Chatillon Crane Scale has a recoil mechanism which protects the rack and pinion against sudden shock; a recessed dial to protect pointer; large easy to read aluminum dial with black graduations and figures, and cases made of malleable iron, with top and bottom rings drop forged. Lightweight and less cumbersome, a 5,000 lb. Chatillon Crane Scale weighs only 93 lbs.

REMEMBER: *John Chatillon & Sons will design and manufacture scales and other measuring devices to meet your particular needs.*

Cat. No.	Cap. Lbs.x Lbs.	Ship. Wt.
10-1000D	1000x5	50
13-1000D	1000x5	74
13-2000D	2000x5	78
15-5000D	5000x10	93
16-10000D	10000x25	240

Weights given above are shipping weights. To order Crane Scale with Hook, add letter H to Catalog number, i.e.: 10-1000DH, 13-2000DH, etc.

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Manufacturers and Designers of Precision Instruments Since 1835

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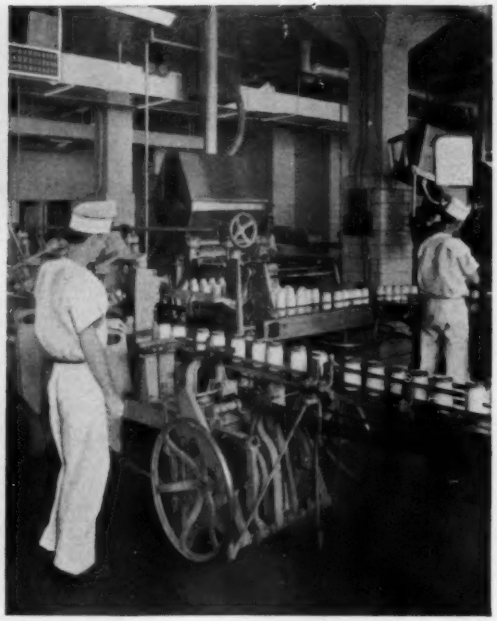


Door Blanketing, Food Processing, Tool Storage, Pottery Drying

Trane Air Conditioning Serves Everywhere in Industry

The right answer for any factory heating, ventilating or air conditioning problem – you'll find it in the Trane line, just as thousands of others have –

Door Blanketing – Drafty shipping rooms are a frequent hurdle to effective factory heating. One midwest steel manufacturer found a neat answer in Trane Projection Heaters. Installed at the ceiling, the units focus warmth at the shipping room doorway and at other critical spots, blocking drafts before they start.

Food Processing – A New Orleans food processor demanded two things of the air in his plant–it had to be just the right temperature and humidity the year-around; it had to be filtered. A complete air conditioning system, with Trane Climate Changers and Trane Compressors, meets both demands.

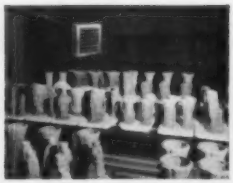
Tool and Gauge Storage – Gauge accuracy, guarded by closely controlled temperatures and humidity, was a must for a midwest bearing manufacturer. Trane Heating and Cooling Coils, Trane Centrifugal Fans and a Trane Compressor provide these conditions in the gauge and tool storage room.

Pottery Drying–When vases and ceramic statues dry, the process must be even and gradual. Hot streams of air or direct blasts from a heater make for uneven drying and cracked pottery. That's why a pottery maker in Illinois uses Trane Horizontal Unit Heaters and Louver Fin Diffusers to hold drying room temperatures even, constantly.

Area Heating – A sprawling plant and a huge open machine shop meant a big heating job in an eastern airplane factory. Trane Torridors, hanging at the ceiling, send a lot of Btu's a long way, so the shop is comfortable and production is humming.

Whatever your heating, cooling, ventilating or air conditioning problem is, look for the answer in the complete Trane line.

Tool Storage–Trane air conditioning keeps temperatures constant, delicate tools, gauges accurate.



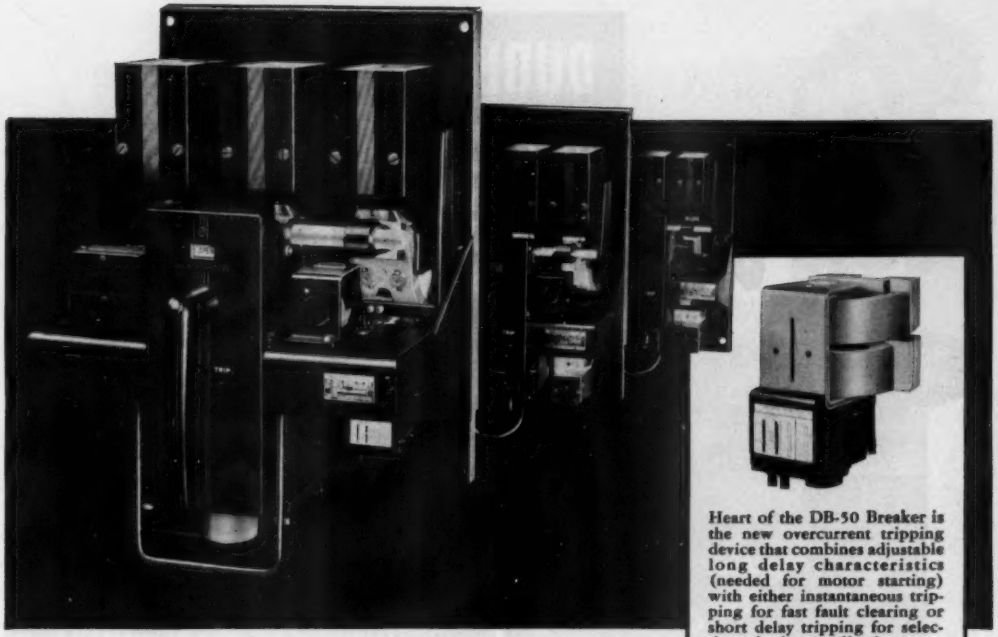
Pottery Drying – Diffused heat from Trane Unit Heaters and Diffusers solves another drying problem.

Area Heating–A lot of heat sent a long way – Trane Torridor handles the big heating jobs easily.

TRANE

MANUFACTURING ENGINEERS
OF HEATING, VENTILATING AND
AIR CONDITIONING EQUIPMENT

THE TRANE COMPANY, LA CROSSE, WIS.
Eastern Mfg. Division . . . Scranton, Pennsylvania
Trane Company of Canada, Ltd. . . . Toronto
OFFICES IN 80 U. S. and 14 CANADIAN CITIES



Heart of the DB-50 Breaker is the new overcurrent tripping device that combines adjustable long delay characteristics (needed for motor starting) with either instantaneous tripping for fast fault clearing or short delay tripping for selective tripping applications.

Now...15,000, 25,000, 50,000 amp.* Breakers *in a UNIFORM DESIGN!*

The new DB-50—most recent addition to the DB line of low-voltage breakers—extends the range of interrupting ratings to 50,000 amperes, continuous current ratings to 1,600 amperes. The co-ordinated design provides uniformity in construction features and operating characteristics, plus a completely flexible overcurrent tripping device.

The ability to close and latch on fault current is the latest and most severe requirement of a modern breaker. This requirement results from delayed tripping schemes designed to provide selective operation. Closely allied is the additional requirement of ability to carry, for periods up to 30 cycles, fault currents equal to the interrupting rating. Contacts, latching mechanism, and closing means of the uniformly-designed Westinghouse DB line of low-voltage air circuit breakers meet these rigid requirements.

The DB-50 has the same desirable unit construction as its smaller counterparts. It is this feature that allows you to add or remove any component as an assembled unit in the field.

Booklets B-4067 on the DB-15 and DB-25, and B-4740 on the DB-50 contain complete information. For copies, call your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

See "Electrical Proving Ground" . . . the dramatic story of the Westinghouse High Power Laboratory in sound and color motion picture. For details, see your Westinghouse representative or write Westinghouse Film Division, Box 868, Pittsburgh 30, Pennsylvania. J-60748

*Interrupting Rating

DESIGN TESTED AND VERIFIED IN THE Westinghouse HIGH POWER LABORATORY

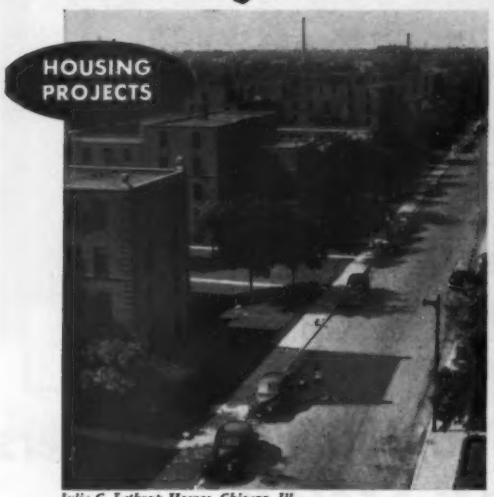
WESTINGHOUSE

"DE-ION" CIRCUIT BREAKERS

DUNHAM

vari-vac differential heating

Cuts fuel costs up to 40%



Julia C. Lathrop Homes, Chicago, Ill.
Architectural Director: Robert S. Degolyer, Chicago, Ill.

Medical-Dental Building, Seattle, Wash.
Architect: W. Henry Fey, Seattle, Wash.

provides precision temperature control for every type–every size–building

Substantial Savings in Fuel Costs are assured with Dunham Vari-Vac* Differential Heating Systems. That's because outside weather and inside temperatures automatically control steam consumption. No more steam is ever used than is necessary.

Dunham Vari-Vac economizes with a "continuous" flow of sub-atmospheric steam at variable pressures and temperatures. In severe weather, Vari-Vac uses steam as "hot" as 218° F. In mild weather, smaller quantities of steam as "cool" as 135° F. are expanded to meet comfort needs.

Sized to Suit Your Needs . . . in New or Existing Buildings Seven different systems are available, depending on the degree of control desired. Whichever system you install — whether a simple, manually operated Basic Job or a fully automatic Supreme Installation — you can be sure of maximum fuel economy and comfort . . . regardless of the size, type, age or location of your building.

**Variable Vacuum*

Instantaneous response to outside weather changes.

Convenience of centralized operation.

Automatic Compensation for heat loss.

Heat supply and demand perfectly balanced.

Send for Free Booklet 2101-20. Tells all you will need know about this amazing system — how it operates, how it may be fitted exactly to your needs. Write for your copy.

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Fin-Vector Radiation • Baseboard Radiation • Convector Radiation • Vacuum Pumps
Condensation Pumps • Horizontal and Vertical Discharge Heaters • Traps • Valves

HERE'S WHY BUILDING ENGINEERS SPECIFY

SPECIAL GREASE-PROOF KENTILE when heavy duty flooring is needed

NO MATTER how constant the exposure to petroleum oils and greases... heavy foot or wheeled traffic, the cheerful, modern colors of a durable, low-cost SPECIAL KENTILE FLOOR can never wear off. With SPECIAL KENTILE the cost of maintenance goes down... workers' morale goes up.

SPECIAL KENTILE FLOORS are rugged floors... resisting the splitting and buckling so often caused by the action of machine oils and lubrication greases; alcohols, alkalis and most acid solutions. Safe, too, because SPECIAL KENTILE is virtually skid proof... fire resistant.

SPECIAL KENTILE goes down quickly, economically over any smooth, firm interior underfloor... even below grade over concrete in direct contact with the earth... and once down they are easiest of floors to keep clean and bright and fresh throughout their long life.

Special Kenbase completes a durable, grease-resistant SPECIAL KENTILE FLOOR. It is applied where floor meets wall... never needs painting... mop and scuff marks won't show. Available in BLACK.

Dept.-D

Please send me the new SPECIAL KENTILE color folder showing money-saving uses for this extra-sturdy, heavy-duty greaseproof floor.

Name_____

Firm Name_____

Firm Address_____

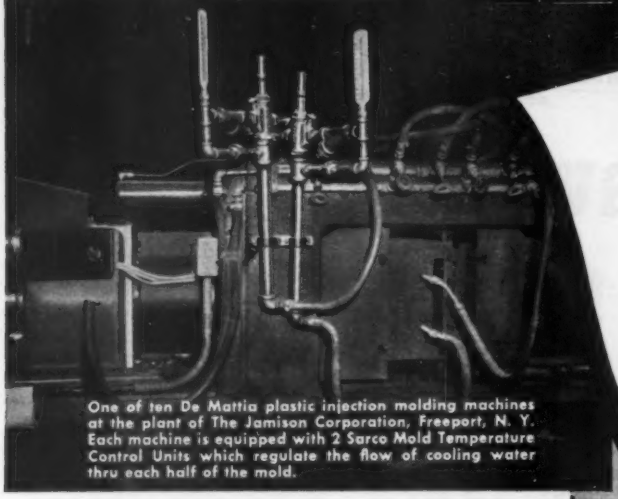
Your Title_____

***Special Kentile** (1/2" thickness) costs about 40¢ per sq. ft. for an area of 1000 sq. ft. May be considerably less or slightly more depending on size and condition of floor and freight rates. For an accurate estimate, consult your Kentile Dealer... he's listed under FLOORS in the classified phone directory. In Canada—at T. Eaton Co., Ltd.

SPECIAL GREASE-PROOF KENTILE®

KENTILE, INC., 58 Second Avenue, Brooklyn 15, New York • 350 Fifth Avenue, New York 1, N. Y. • 705 Architects Building, 17th and Sansom Streets, Philadelphia 3, Pennsylvania • 1211 NBC Building, Cleveland 14, Ohio • 225 Moore Street, S.E., Atlanta 2, Georgia • 2020 Walnut Street, Kansas City 8, Missouri • 1440 11th Street, Denver 4, Colorado • 4532 South Kolin Avenue, Chicago 32, Illinois • 1113 Vine Street, Houston 1, Texas • 4501 Santa Fe Avenue, Los Angeles 58, California • 95 Market St., Oakland 4, Calif. • 452 Statler Building, Boston 16, Mass.

Cooling Control



One of ten De Mattia plastic injection molding machines at the plant of The Jamison Corporation, Freeport, N. Y. Each machine is equipped with 2 Sarco Mold Temperature Control Units which regulate the flow of cooling water thru each half of the mold.

"SAVES $25.00 EACH DAY ON EACH MACHINE"

If maximum production of quality plastics is to be secured from an injection molding machine, nothing can be left to chance.

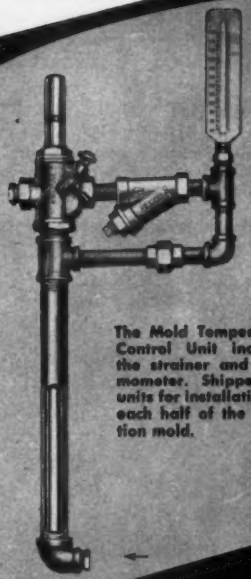
Control must extend not only to raw material, timing cycle and injection pressure – it must include also the temperature of the mold.

SARCO Self-Operated Temperature Regulators

are easily connected to the cooling water system. Constant mold temperature increases production, cuts rejects, and saves water.

Of a similar installation on four machines at Caldwell Products, Inc., New York, Mr. Leaf, Plant Superintendent writes:

"These Sarco controls have been in operation and are wonderful. Increased efficiency saves at least $25.00 each day on each molding machine. In addition, the reduction of rejects has saved us raw materials. As further bonus, we save water."



The Mold Temperature Control Unit includes the strainer and thermometer. Shipped as units for installation on each half of the injection mold.

348

Also used on COOLING SYSTEMS for

AIR COMPRESSORS
SOLVENT STILLS
LIQUID FEEDERS
PIGMENT GRINDERS
DEGREASERS, ETC.

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TESTING TIPS

for the maintenance of plant equipment

Portable Testing Instruments Ideal for Precise Measurements

General Electric's Type AP-9 (for a-c) and DP-9 (for d-c) portable testing instruments are used for production testing, maintenance work, and trouble investigations where precise measurements are required.

Their accuracy of ¾ of 1% for a-c and ½ of 1% for d-c also makes these instruments well suited for use in industrial and educational laboratories.

Small in size—2½ by 6½ by ¾ inches—Type AP-9 and DP-9 portables are easy to carry and easy to store. Their strong Textolite* cases have snapdown covers that protect the scale and binding posts. The distinct scale markings, mirror scale, and knife-edge pointer help an operator to eliminate reading errors.

These instruments can also be supplied with a pointer stop to make instantaneous readings easier. AP-9 and DP-9 instruments with the pointer-stop feature are particularly adapted for measuring welding current, motor-starting current, and voltage dip.

*Reg. trademark of General Electric Co.

YALE & TOWNE CUTS TESTING TIME 10% WITH EASY-TO-USE G-E HAND TACHOMETER

Both Linear and Rotating Speeds Measured With Same Instrument

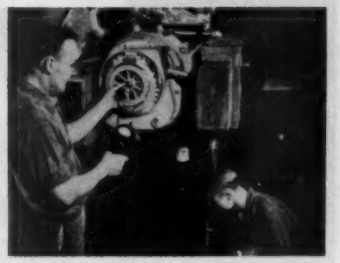
"Besides cutting our testing by 10%, the new G-E hand tachometer has proved to be the only speed-measuring instrument which we have that will give an accurate and instantaneous reading," reports Yale & Towne Manufacturing Co., Philadelphia, Pa. Yale & Towne, manufacturers of materials-handling equipment, finds it necessary to make extensive tests on its hoist motors before shipment.

By using the G-E hand tachometer this company is able to take rapid readings of each hoist at various loads and operating speeds. During testing, it is necessary to take instantaneous readings of the hoist's speed during the raising or lowering of loads.

UNIQUE REACTANCE PRINCIPLE

Employing a unique electrical-reactance principle, the G-E tachometer consists of two units; the head and the indicating unit. The two are joined together by means of a two-foot flexible electric cable. Power for the tachometer is obtained from a single standard battery located in the indicator handle.

A simple adjustment of the "check-battery" knob on the front of the instrument compensates for any possible change in voltage. The G-E hand tachometer has sustained accuracy of 1% of full scale.



Measuring ranges for rotational speeds are from 200–10,000 rpm in three ranges, and linear speeds from 20–10,000 fpm in six ranges. High- and low-speed adapters are available to further extend the speed-measuring ranges. Both a 1 ft and a 1/10 ft circumference disc and roller are also supplied.

ALLEGHENY LUDLUM PLANT ENGINEER REPORTS...

"Our AK-3 hook-on power factor meter enables us to quickly and easily obtain power factor readings in our outdoor switching station with the minimum amount of trouble," says R.M. Brooks, Allegheny Ludlum Plant Engineer.

Allegheny Ludlum Steel Corp. is now increasing the capacity of its present operation at Watervliet and has found the AK-3 to be of great value in checking power factor in new feeder banks in its outdoor switching station.

Designed to help you lower power bills, improve voltage regulation, and reduce needless heating of power cables, the AK-3 may be used on any balanced three-phase circuit. It reads power factor directly in circuits with voltages from 100 to 600 volts and currents from 15 to 600 amperes. The AK-3 weighs only 4½ pounds, and will handle conductors up to 2 inches in diameter. Readings are obtained by merely clipping in the voltage leads, hooking around the line and reading PF directly on the scale.

GENERAL ELECTRIC

SECTION C 602-215, GENERAL ELECTRIC
SCHENECTADY 5, N. Y.

Please send me the following bulletins:
Indicate:
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☐ Type AK-3 Power-factor Meter GEC-775
☐ Hand Tachometer (GEC-241)
☐ AP-DP-9 Portables (GEC-830)

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the compressor that's saving space and manpower in supplying plant air for a

Major Auto Manufacturer

Clark CBA-4 Balanced-Opposed, Motor-Driven Air Compressor. 1500 BHP. 8400 CFM. Discharge pressure 100 psig. Location: Michigan.

One compressor that does the job of several . . . compactness that's economical of space . . . vibration-free operation that simplifies foundation requirements . . . these are the decisive points that prompted a major auto manufacturer to replace many smaller units with one Clark Balanced/Opposed, Motor-Driven Air Compressor. And now, as proof of performance, two additional units will soon be delivered to effect further economies for this famed builder of quality cars.

But, being so well suited to the compressed air requirements of the automotive industry is only a partial measurement of the Clark motor-driven unit's service to other fields. Petroleum, chemical and other industries are equally strong for the space-conserving, cost-conserving aspects of this Clark-pioneered, design . . . the only balanced-opposed, motor-driven compressor manufactured in three stroke sizes covering a range of 150-4500 BHP.

Obtain full data from your nearest Clark representative. Illustrated catalog dispatched promptly.

SEE the difference in

CLARK®

balanced/opposed

MOTOR-DRIVEN COMPRESSORS

MIDGET ANGLE • RIGHT ANGLE • BIG ANGLE
ELECTRIC-DRIVEN • CENTRIFUGAL

CLARK BROS. CO., INC.
OLEAN, N. Y.

One Of The Dresser Industries

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LO-HED HOIST

handles machine parts at minimum cost

PLACE: Heat treating department, Wiedemann Machine Company's new plant, Philadelphia.

PROBLEM: Quick and economical handling of parts for turret punch presses and special machinery.

SOLUTION: An eight-wheel motor trolley B-2 Lo-Hed Hoist ...on a Philadelphia Tramrail Company two-ton type U.S.M. crane.

INSTALLATION: By Philadelphia Tramrail Company, Philadelphia, Pa.

Lo-Hed Hoist is designed and constructed for longer working life at lower cost. As there are no working parts under the "I" beam or track, Lo-Hed lifts loads higher. Its hook is suspended on an oil-impregnated bearing and eliminates tangled lines.

Lo-Hed affords maximum safety, too. It has a completely shrouded bottom block. On A. C. installations a transformer puts 110 volts instead of line voltage at the push button controls.

Lo-Hed comes in five suspension types . . . capacities from 500 to 24,000 lbs. The right unit can be readily engineered to your exact requirements. Mail coupon for complete information.

LO-HED MEANS LOW OVERHEAD

LO-HED CAR PULLER is electrically driven... enables you to move railroad cars on your siding cheaply and safely...cuts demurrage costs...And it's a money-saver *inside* a plant; pulls anything within its capacity that can slide or roll.

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COMPANY
PHILADELPHIA 25, PENNA.

AE Products are: Taylor and Perfect Spread Stokers, Marine Deck Auxiliaries, Hele-Shaw and Hydramite Fluid Power, Lo-Hed Hoists, Lo-Hed Car Pullers.

American Engineering Company
2503 Aramingo Avenue, Philadelphia 25, Pa.

Gentlemen: Kindly send me full information about ☐ Lo-Hed Hoists . . . ☐ Lo-Hed Car Pullers.

Name_____ Title_____

Company_____

Address_____

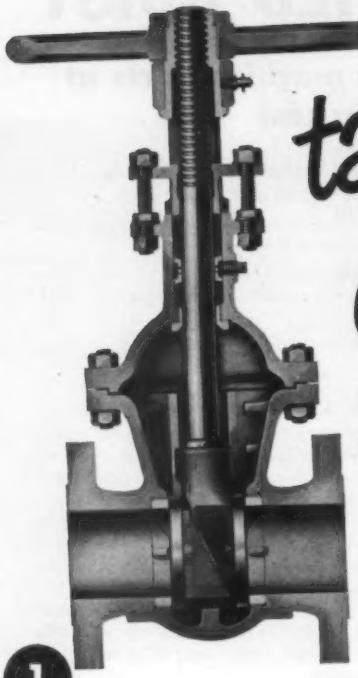
City_____ Zone____ State_____

PLUS VALUES, JOB-PROVED AGAIN AND AGAIN

DARLING VALVES

take your choice...

FOR BETTER, LOWER COST SERVICE WITH DARLING cast steel gate valves



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2

DARLING VALVES FOR EVERY NEED

Darling gate valves are made in a wide range of sizes, types and constructions for all kinds of normal and unusual service . . . and for pressures up to 1500 pounds.

IN addition to gate valves of solid wedge design, Darling offers two other types. Both have distinctive features that prolong valve life while minimizing down time and maintenance. They're great time and money savers! . . .

1 This view shows a Darling gate valve of the fully revolving, double disc, parallel seat type. Time and again users rate it the most trouble-free, best performing gate valve obtainable today. Why? Because its unique design assures: *automatic* adjustment for valve body distortion . . . positive, easy operation . . . uniform wear distribution . . . foolproof simplicity in maintenance and reassembly . . . and service life seldom if ever equalled.

2 Take a close look at the slotted, double-grooved wedge in this cutaway view. There's little wear and tear on *these* wedge faces and seats because the slot permits compression of the wedge to compensate for valve body expansion or contraction due to temperature changes. Moreover, the double grooves, with twin guide ribs in the valve body, provide twice the usual bearing area, eliminating wedge canting and avoiding damage to the downstream seat.

SEND FOR BULLETIN

Why not get *all* the facts on these money-saving valves? Then *you* can analyze and decide whether or not you stand to gain by giving Darlings a try. Simply specify your service requirements . . . or ask for cast steel valve bulletin.

DARLING VALVE & MANUFACTURING CO.
Williamsport 14, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ont.

Tops

LIKE SPEER MULTIFLEX BRUSHES

For Low Energy Loss

U.S. PAT. 2,781,067

SPEER Carbon CO.

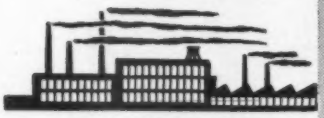
ST. MARYS, PENNSYLVANIA

Subsidiaries

Speer Resistor Corp.—International Graphite & Electrode Corp.
Jeffers Electronics, Inc.

7584

Like having a tool store right at your door!



Here's efficient tool service— direct to you— through a nearby

Snap-on

factory branch...

SNAP-ON SERVES INDUSTRY EVERYWHERE THROUGH THESE 41 FACTORY BRANCH WAREHOUSES

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BROOKLYN 25, N. Y., 1649 Bedford Ave.
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CLEVELAND 13, OHIO, 2912 Euclid Ave.
DALLAS 1, TEXAS, 2932 Commerce St.
DENVER 3, COLO., 1050 Broadway
DETROIT 2, MICH., 93 Piquette Ave.
EDMONTON, ALBERTA, 10232 103rd St.
FARGO, N. DAK., 421 N. P. Ave.
HOUSTON 3, TEXAS, 1810 LaBranch St.
INDIANAPOLIS 2, IND., 848 Fort Wayne Ave.
JACKSONVILLE 6, FLA., 1602 Walnut St.
KANSAS CITY 2, MO., 3635 Main St.
LONDON, ONTARIO, 111 Mt. Pleasant Ave.
LOS ANGELES 14, CALIF., 1717 W. 6th St.
MILWAUKEE 3, WIS., 2600 W. State St.
MINNEAPOLIS 3, MINN., 1218 Harmon Place
MONTREAL 15, QUEBEC, 751 Jean Talon St. West
NEWARK 6, N. J., 823 Sandford Ave.
NEW ORLEANS 13, LA., 1040 Camp St.
NEW YORK 56, N.Y., 397 East 167th St.
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OMAHA 2, NEBR., 109 S. 24th St.
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REGINA, SASK., 2070 Albert St.
RICHMOND 20, VA., 1617 West Broad St.
SAN FRANCISCO 2, CALIF., 635 Golden Gate Ave.
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Ever needed tools *fast?* What plant hasn't? To meet just such emergencies—as well as the year-'round normal tool needs of all Industry—Snap-on maintains the 41 factory branch warehouses listed here. The complete Snap-on line offers more than 4000 tools for industrial production and maintenance. Snap-on factory branches make them quickly available to factories and shops everywhere. Snap-on branches are staffed with tool specialists experienced in the needs of industry. A phone call brings Snap-on service right to your door... *try it!* For latest Snap-on Industrial and General Catalog, write—

SNAP-ON TOOLS CORPORATION, 8068-J 28th Ave., Kenosha, Wis.

A complete national tool service
.... Engineering
.... Manufacture
.... Distribution

(Continued from page 96)

adaptable to a wide range of electrical devices including air cooled inert gas, and silicone filled transformers. Advantages announced by manufacturer include savings on materials, greater factors of safety.

Quinterra Type 3 is supplied in sheets, rolls and tapes; widths vary from ¼ to 36 in. This insulation may be used alone or combined with other dielectric materials. Johns-Manville, 22 E. 40th St., New York 16, N. Y.

CURRENT REGULATORS

Are oil-cooled, automatically controlled units of compact size

Constant current transformers of the new Subway Type CMH feature lighter weight, higher efficiency, and smaller size, manufacturer reports, because of their hypersil core construction, and if necessary they can operate submerged in water. Their heavier tank construction is said to insure longer life and extra ruggedness.

These new regulators conform to EEI and NEMA standards and come in ratings from 3 to 30 kw primary voltages of 2400 or 4800 and secondary currents of 6.6 or 20 amp at 60 cycles. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

FLOORING MATERIAL

Is developed for longer service, resistance to heavy wheel traffic

The addition of pulverized natural rubber to a floor material consisting of asphalt-rock limestone and cold asphalt emulsion is credited with greatly increasing the life span of the floor, reducing brittleness in sub-freezing weather, providing greater traction when wet and lessening the tendency to rut under heavy point loads. Resistance to loads impact and shock is said to be three times as great as for the same material without the rubber. As manufacturer says, there's a "liveness" about the installed floor which indicates its ability to "fight back" at traffic.

The flooring, named Immediate-Set, is suggested for large area floor resurfacing with a relatively thin layer, and for patching small damaged areas; after rolling or tamping, it can be used immediately. Immediate-Set is factory mixed and shipped in 100 lb lined fabric bags. If desired, the complete aggregate may be obtained in multi-walled bags with a supplementary pail of asphalt emulsion for on-location mixing. Flash-Stone Co., Inc., 30 E. Rittenhouse St., Philadelphia 44, Pa.

DRY-TYPE TRANSFORMERS

With Class B insulation, are smaller in size, lighter in weight

For single-phase 60-cycle operation, this new design provides smaller transformers at an average weight reduction of 30 per cent throughout the line and some models of these general purpose dry-type transformers weigh less than half as much as the units they replace.

Size and weight reductions are credited to the use of improved core steels and increased amounts of inorganic insulating materials. The insulation withstands higher temperatures in the copper winding, company explains, an 80 C rise over a 40 C ambient, and the corisil core (a grain oriented cold-rolled silicon steel) provides comparable losses at higher flux densities. The net result is less copper and steel

MOST VERSATILE LIQUID FILTER EVER DEVELOPED

SUPERIOR to any other filter in flexibility and versatility. Puts you ahead of changes that tomorrow may bring. Provides unusual efficiency and economy. Already field-tested over a broad range of applications.

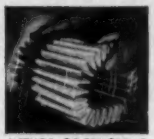
WIDE VARIETY OF FILTERING MEDIA

Design permits use of media to suit practically every requirement. Any medium—metallic, plastic, or fabric—that comes in sheet form and can be crimped may be used. Tested media include types resistant to both hot and corrosive liquids; also types to remove dirt particles down to 2 microns (.000078″) or less in size.

Model ELS Filters handle a total of 105,000 gallons per minute in one large industrial plant.

NEW *SLIP-ON* INSERT FOR QUICK CHANGE OF MEDIUM

An entirely new idea in the application of filtering medium, the STAYNEW SLIP-ON INSERT, permits quick change or replacement of medium.



METHOD OF REMOVING SLIP-ON INSERT

LOW FIRST COST, LOW MAINTENANCE COST

Volume production of an economical design means low first cost. Ease of cleaning or replacement of medium mean low maintenance cost.

LARGE FILTERING AREA IN SMALL SPACE

The well-known Staynew Radial Finned Insert Construction provides the largest possible filtering area for available space.

★ **PARTIAL LIST OF USES** ★

WATER • LAQUERS • VARNISHES • FUEL OILS
COOLANTS • LUBRICATING OILS • ETC., • ETC.

New Uses Developing Constantly.

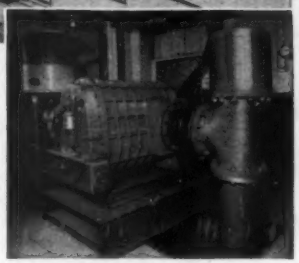
DOLLINGER CORPORATION

DOLLINGER STAYNEW FILTERS

REPRESENTATIVES IN PRINCIPAL CITIES

55 CENTRE PARK, ROCHESTER 3, NEW YORK

Expansion at BRILLO includes: STANDARDAIRE BLOWERS



Installation of Standardaire Blower at Brillo Manufacturing Co.

TO keep pace with the ever increasing demand for Brillo Manufacturing Company products, numerous plant additions have been made since 1913, when the company first started operations. Another million dollar expansion program is now underway—when completed it will provide increased floor space for greater productive capacity. In conjunction with this program Brillo has installed two 105B25 Standardaire Blowers, each having a capacity of 3600 c. f. m. at 1750 r. p. m. These blowers are in continuous round-the-clock service, supplying the necessary air to whisk away the metal turnings incidental to the processing of the famous Brillo pads. Standardaire Blowers are built to take this grueling service in stride. Rigid material specifications and skillful workmanship assure long, trouble-free performance, even when operating under extraordinary conditions. Standardaire Blowers are winning new users every day due to their ability to produce more air in less space with less power consumption.

For complete information write Dept. E11
READ STANDARD CORPORATION,
370 Lexington Avenue, New York 17, N. Y.

BLOWER-STOKER DIVISION

FORMERLY The Standard Stoker Co., Inc.
ONLY THE NAME IS CHANGED

READ STANDARD
CORPORATION

NEW YORK • CHICAGO • ERIE • YORK • LOS ANGELES

per kva of output. Certain ratings are now available; the line ultimately will consist of about 50 models in ratings of 3 kva and upwards. Specialty Transformer and Ballast Divs., General Electric Co., Schenectady 5, N. Y.

COPYING MACHINE

For medium volume production of prints from tracings, drawings

Offering a 46-in. printing width with exposure speeds to 95 in. per minute, the new Copyflex Model 20 is said to be lower priced than most machines in its volume range. The Model 20 requires no installation, just a connection to a 60 cycle, 115 a-c line.

Copies may be made on Copyflex sensitized paper, acetates, film and cloths. No special lighting is needed. Dark rooms, developing trays are unnecessary, company says, and there is no need for extra ventilation. Operation of the Model 20 involves only feeding the sensitized medium into the machine with the translucent original to be copied. Charles Bruning Co., Inc., 100 Reade St., New York, N. Y.

PRODUCTION LINE UNIT

Is combination tool suspension and air supply hose reel

This compact, packaged unit is easily installed over the work bench on high-speed production assembly lines. The pneumatic screw driver or other tool is suspended on the hose which supplies the air. The weight of the tool is counterbalanced by the spring tension of the reel. Releasing the tool lifts it automatically to its predetermined position over the work spot, letting operator have both hands free to remove work from the machine.

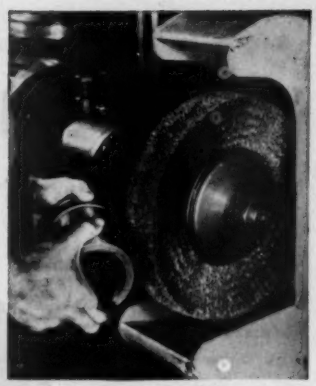
Unit is equipped with 15 ft of ¼ in. ID hose with male-fitting standard, a rubber bumper stop to control length of travel when tool is released and universal mounting brackets. Write for bulletin and prices. Wayne Pump Co., Fort Wayne 4, Ind.

FLUORESCENT FIXTURES

Neg'ator balanced, can be cleaned and serviced at floor level

Servicing of these lighting fixtures by regular maintenance personnel working at floor level is possible because of a simple counterbalancing device based on the neg'ator, an elastic member developed by the Hunter Spring Co. Industrial lighting fixtures of all sizes may be drawn from any operating height to remain stationary at a convenient level for replacement of tubes or starters and cleaning of reflecting surfaces. Power is automatically disconnected as fixture is lowered.

Counterbalancing of fixture's weight is provided in minimum space by two neg'ator B-motors in the fixture housing. In the B-motor, the neg'ator, a strip of flat spring material formed so its relaxed shape is a tight coil, is wound from the storage bushing onto the output bushing carrying the cable drum as the fixture is pulled down.



SIMPLIFIES CLEANING. Osborn power brushes efficiently remove scale, rust, grit, old paint, prepare surfaces for welding . . . deburr metal parts . . . rough up rubber. Built for manual or automatic operation in a wide range of types, sizes and fill materials.

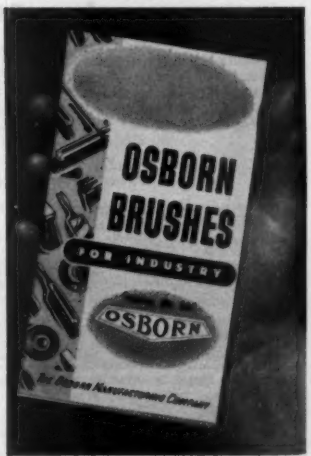
BUILT FOR INDUSTRY by the company that knows Industry's problems, OSBORN Master* Sweep Floor Brushes and other maintenance brushes are designed to do your jobs better—faster.

How to tell *quality* in brushes . . . just look for "OSBORN"

IT is easy to buy good industrial brushes. Just specify "OSBORN" and order them automatically from your Industrial Distributor along with other mill supplies. You are sure to get the best in workmanship and materials. Osborn brushing tools are backed by 59 years of service to industry throughout the world.

Write for handy pocket catalog. *The Osborn Manufacturing Company, Dept. 557, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

*Trade Mark

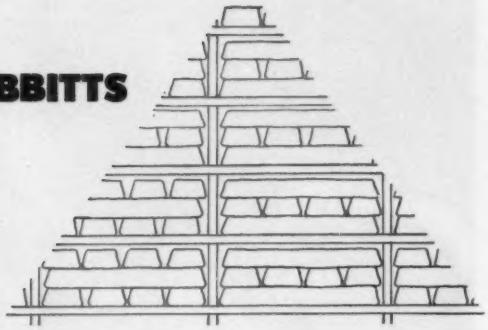


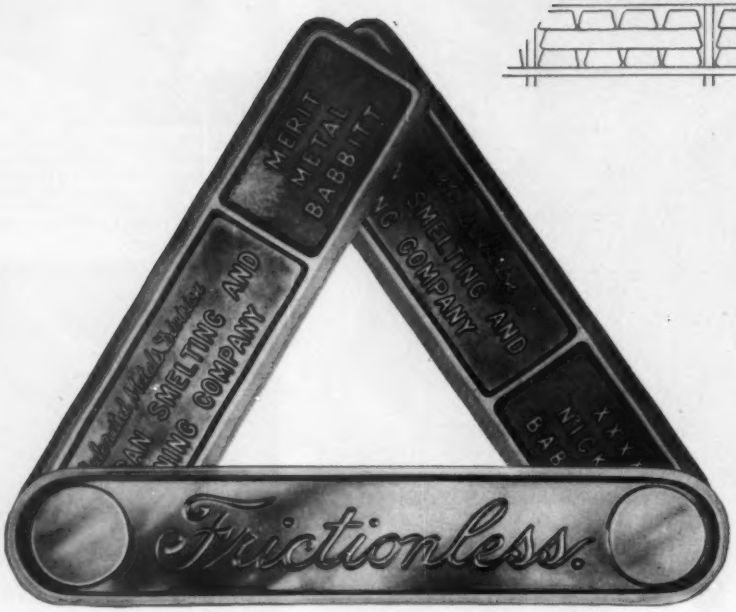
FREE HANDY CATALOG.....Describes OSBORN maintenance brushes for every industrial need. Handy pocket size. Write for your free copy.

OSBORN

LOOK FOR THE NAME OSBORN . . . RECOGNIZED EVERYWHERE FOR QUALITY WORKMANSHIP AND MATERIALS

FEDERATED'S "BIG 3" BABBITTS





for 90% of all maintenance bearing work

Federated's "Big 3" now includes the famous Frictionless® Bearing Metal. With XXXX Nickel® for heaviest loads and extreme speeds, and Merit Metal, "the Universal Babbitt," for moderate loads and moderate speeds, Frictionless is the low-cost item for a wide variety of services in which it has proved its reliability for many years.

Frictionless will continue to be manufactured to exactly the same formula which has made it one of the country's most popular babbitts.

With Federated's "Big 3" bearing metals in your stockroom you can pour the right bearing to fill practically any machinery or equipment maintenance requirement.

For special applications Federated will continue to produce bearing alloys to customers' specifications.

For most customers' maintenance requirements Federated recommends the "Big 3". It's a combination which will hold down stockroom items . . . minimize the risk of shortages . . . simplify inventory control and purchasing.

Federated Metals Division

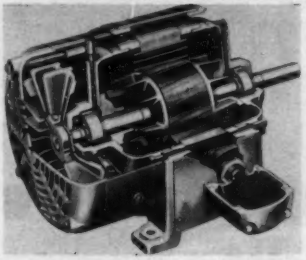
AMERICAN SMELTING AND REFINING COMPANY • 120 BROADWAY, NEW YORK 5, N. Y.

The constant counterbalancing force is produced by the neg'ator trying to return to its relaxed shape on the storage bushing. The Thompson Electric Co., 1100 Power Ave., Cleveland 14, O.

EXPLOSION-PROOF MOTORS

Totally enclosed, in 3 to 75 hp capacities, for hazardous spots

The Types SE and SES Motors carry Underwriters' label for use in locations



involving highly inflammable gases and volatile liquids, and for use in the presence of combustible dusts.

Features of the motors include sealed terminal, elongated spark-arresting bearing sleeves, high-draft ventilation, Lubri-flush bearings, asbestos-protected windings. Being completely sealed, motors are also protected against moisture, abrasives and other substances. Bulletin 1629 describes these explosion-proof motors. U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54, Cal.

FLOOR COVERING

Is long wearing, designed to prevent slipping accidents

Fera-Mat provides a non-slip walking surface composed of durable mineral granules resin-bonded to a heavy-duty weatherproof cloth backing. It is supplied with a protective liner on the underside which is peeled off at the time of installation, and has a pressure sensitive adhesive which makes it adhere to any clean, dry and smooth surface. It comes in cleats 6½ by 24 in. or in rolls 6 ft wide by 96 ft long.

This floor covering is suggested for steps, ramps, platforms, walkways and cat-walks, also entrances and corridors, storerooms, kitchens and wherever a non-slip surface is desired. Manufacturer says Fera-Mat is non-rigid and reasonably heavy loads can pass over it without damage, and that maintenance is simple because dirt can be brushed out. American Abrasive Metals Co., 460 Coit Rd., Irvington 11, N. J.

PERMANENT MARKERS

For wire or cable, are made of Vinylite plastic rigid sheet

Available in either flat or sleeve type these plastic markers also have an overlay of clear Vinylite plastic to protect the lettering. They're announced as resistant to abrasion, water, oil, gasoline, alcohol and most acids and as both fungus proof and vermin proof.

Sleeve-type markers from 1/16 to 3 in. dia slip tightly over wire or cable of any shape in cross section. Any type of indentification as well as color banding can be printed on the marker. Flat-type markers can be had in any size, shape or thickness, with holes

(Continued on page 122)

BASIC FACTS ABOUT MODERN MATERIALS HANDLING

HOW IT WORKS — WHAT IT DOES— WHAT IT SAVES

Study of major importance to business and industry is made available by CLARK

A practical, profitable way to produce more goods with the same amount of human effort, is presented simply and graphically in a new booklet offered by the Industrial Truck Division of the Clark Equipment Company, of Battle Creek, Michigan.

This booklet points up technological advances in materials handling operations that are effecting extraordinary benefits for industry—such as faster production, increased economy and efficiency, improved human relations, lower accident and damage rates, quickened distribution and substantial cash savings. Simply and directly it describes tested and proved means to help speed up and perfect the imperative integration of a military and a civilian economy

2-BILLION SAVING POSSIBLE

Concretely, this study points up a quick and certain way for Industry to save some $2,000,000,000* annually at a time when the country, faced with a rearmament program of 50 billions a year for at least three years, is in desperate need of every possible mechanical aid to save time and speed production. Many advantages in other directions, not reckoned in dollars and cents, will be recognized at once by every reader

This new CLARK study is neither fancy nor complex. It is a well-illustrated, simply-written exposition of the sound and sensible fundamentals on which modern materials handling techniques and practices are based. It describes ways and means of getting the most out of fork-lift trucks, powered hand trucks and industrial towing tractors, at the least possible cost. For the many businesses which have not yet adopted modern handling methods and machines, the booklet will be found invaluable. For the thousands of progressive businesses already employing modern methods and machines, it is just as valuable as a check against omissions, abuses and opportunities for full achievement of production goals and potentials.

SEND FOR YOUR COPY

To get a copy of *"Basic Facts About Materials Handling"* fill out the coupon, attach it to your business letterhead and mail it to the *Clark Equipment Company, Industrial Truck Division, Battle Creek, Michigan.* If you want additional copies for key personnel, they are available in reasonable quantities.

**Materials Handling Case Book; McGraw-Hill Book Co., Inc. 1951*

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS · INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION · CLARK EQUIPMENT COMPANY · BATTLE CREEK 90, MICHIGAN

Please send the following: ☐ BASIC FACTS ☐ SAFETY SAVES ☐ CONDENSED CATALOG ☐ MOVIE DIGEST

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The Control Center that OUTSMARTS ACCIDENTS

No longer is it necessary to expose personnel to "hot" buses or to sacrifice safety to gain accessibility to your control centers. Removal and replacement of Westinghouse Starter Units is safe and simple. "Magna-Grip" stab connectors simply "plug-in" to the power bus.

1 **To work on the panel,** starter unit may be withdrawn to a tilt-out disconnect position and locked. The unit is "dead" . . . completely disconnected from the power bus and self-supporting in this position. Protection is assured since it is impossible to reach around the starter unit and touch the bus.

2 **For work on the bench,** it is a simple matter to remove the complete starter unit. Note that the *unit door remains on the panel* so that it can be closed to guard the exposed bus. Rigid guide rails in the structure facilitate replacement of the starter unit. These rails align the starter and steer the "Magna-Grip" stab connectors into accurate contact with the power bus.

Westinghouse Control Centers offer still more points of safety.

For example:

Complete baffling to localize unusual arcing if faults occur.

Interrupting capacity of each starter not less than 15,000 rms amps.

Self-cooling construction for foolproof ventilation.

Sturdy structures that are self-supporting.

Get all the facts as presented in booklet B-4213 from Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-27008

DESIGN TESTED AND VERIFIED IN THE Westinghouse HIGH POWER LABORATORY

WESTINGHOUSE

CONTROL CENTERS

(Continued from page 46)

to 60 fpm, its design featuring a continuous series of buckets suspended between two endless chains. Illustrated with photos, sketches, assembly diagrams. Discusses travel guard permitting automatic direct loading, automatic unloading, bucket construction. A bucket carrier circuit is illustrated. Hapman Conveyors, Inc.

142 Vibrating Screens—Book 2377, 20 pp, presents vibrating screens for fast, accurate dry-screening of light and fine materials, also liquid vibrating screens for low-cost, high-speed separation of solids from liquids. Includes specific information on selection of right screen and cloth for operating efficiency; dimension tables, weight and horsepower requirements. Many installations pictured. Link-Belt Co.

CONSTRUCTION AND MAINTENANCE

143 Aluminum Building Sheet—Stressing advantages of aluminum for siding and roofing, 12-pp Form AD-347 presents both dimensional data and engineering details covering its use. Provides illustrated suggestions for use of fasteners, comprehensive flashing details, directions for applying the sheet. Includes tips on painting, welding, storing, also gives coverage figures, suggested specifications. Aluminum Co. of America.

144 Power Driver—Bulletin TA-18 describes a power driver which drives steel studs instantly into steel, concrete or masonry and has a wide range of construction and maintenance applications. Construction details of the driver and its integral cartridge assembly are discussed, illustrated. Lists more than 40 job applications, catalogs studs units available for use in small and large bore barrel. Velocity Power Tool Co.

145 Ordering Guide for Tools—Catalog TR, just released, covers manufacturer's complete line of over 4000 tools. Contains 104 pp of information on all types of socket wrench equipment, hand tools and wrenches, punches, chisels, screwdrivers, pliers, tool boxes and related tools for servicing operations and maintenance work. Features large illustrations of all types of wrenches with copy keyed for easy identification. As complete specifications are included, it's easy for plant engineers to find exactly the tool needed for a particular job. Snap-on Tools Corp.

146 "Up Faster" Scaffolding—Bulletin 120 describes and illustrates manufacturer's Exhibit steel panel scaffolding featuring interchangeable basic components and gravity locking system that requires no bolts or other fasteners. Stresses speed and simplicity of erection, versatility. Pictures typical installations. Universal Mfg. Corp.

PIPING, VALVES, TRAPS

147 Manifold Discharge Piping Application—Manual 51-B, 34 pp proposes an approach to design of discharge header systems based on partial or complete elimination of back-pressure effects on tied-in safety-relief valves. This principle is claimed to offer great savings in cost of discharge piping. Manual gives operating test data on company's line of FarriSeal and BalanSeal bellows-type safety relief valves. Analyses economics of standard design practice as it effects cost of pressure relief in closed systems where control or recovery of lading fluid is essential. Farris Engineering Corp.

148 Pipe and Fitting Materials—Presenting at-a-glance information including ASTM specifications, chemistry, service temperature limits and welding characteristics, this 3-color chart covers a wide range of pipe and fitting materials according to name or standard type numbers. Includes carbon steels and wrought iron, stainless and intermediate alloy steels, nickel, aluminum and copper and alloys of these metals. Tube Turns, Inc.

149 Valves, Driers, Gages—Catalog, 100, 16 pp, fully illustrated, presents ordering information, application recommendations on packless and packed valves, relief and check valves, strainers and driers, and liquid level gages, for refrigeration, air conditioning, industrial use. Balanced action design incorporated in diaphragm packless valve is explained in detail. Includes sizes, prices. Henry Valve Co.

150 Steam Trap Selector—Bulletin T-1750 is a 20-pp supplement to company's Catalog T-1740 released earlier, and contains excellent selection data. Applications, listed alphabetically, cover traps for uses from acid vats to vulcanisers, also traps for kitchen, laundry and special equipment. Provides full capacity, pressure and temperature information, installation tips. Yarnall-Waring Co.

151 Plus Protection—Vol. 2, No. 2 of The Magnesium Anode is a 2-pp discussion of the value of supplemental cathodic protection for coated pipelines, using magnesium anodes as a source of current. Dowell, Inc.

152 Nickel Pipe and Tubes—Bulletin T-17 is a 27-pp technical bulletin on the fabrication and design of nickel and high nickel alloy pipe and tubing, illustrated throughout by drawings and photos. Presents tables on mechanical and physical properties, ASME code requirements, procedures. The International Nickel Co., Inc.

WATER CONDITIONING

153 What's New on Ion Exchangers—Here are three brand new booklets on company's ion exchangers: Nalcite HCR, a styrene type cation exchanger; Nalcite SAR, a strongly basic anion exchanger; and Super Nalcolite, a synthetic gel type zeolite for cation exchange. Discussions are supplemented with tables and graphs explaining performance of these water treating resins under various operating conditions. Physical characteristics, exchange capacities, regeneration techniques are explained. Data are adequate for planning water treating installations. Bulletin 57, 20 pp, is on Nalcite SAR; Bulletin 58, 28 pp, on Nalcite HCR; Bulletin 59, 8 pp, on Super Nalcolite. State choice. National Aluminate Corp.

154 Feedwater Treating—Bulletin 1835, 30 pp, features manufacturer's hot process Accelerator for use in treatment of boiler feedwater, illustrating and explaining its operation and advantages, also optional auxiliary equipment. Contains excellent discussion of the necessity of treatment of makeup water, selection of proper equipment. Also covers limitations of hot process softening. Infilco Inc.

155 Single-Tank Deionizer—Bulletin 312, 6 pp, describes single-tank deionizers of mixed-bed, monofio design which provides greater capacity and produces water of high chemical purity free from ionizable impurities including CO_2 and silica. Illustrated, includes engineering and technical data covering range of sizes. Elgin Softener Corp.

HEATING

156 Economy of Steam in a Package—Illustrated Bulletin ID-51-113 shows how packaged steam generators save money where heat and power are needed. Details manufacturing, installation and operating advantages. Discusses boiler construction, special design features. Also covers sizes available, specifications and ratings, wide range of fuels. York-Shipley, Inc.

157 Converters and Water Heaters—Four completely new series of units for heating service or process water or radiation, using steam or boiler water as the heating medium, are presented in Form 502010, 28 pp. Specifications, dimensions and control arrangements are given for two converters, and two water heaters, one of which is furnished in two-pass or four-pass design. Arranged for easy selection of correct unit, discusses application for each type, includes capacity data, tells how to determine amount of steam required. Taco Heaters, Inc.

METALS

158 Corrosion Resistance of Copper—The results of 25 years of research into the nature of corrosive attack on copper and copper alloys are told in 24-pp Anaconda Publication B-36. Explains chemical, physical nature of corrosive attack in its various forms. Includes tabulation indicating relative corrosion resistance of principal types of copper and copper base alloys when in contact with 185 corroding agents. Also lists typical industrial uses of these metals; gives composition, available forms and physical properties of company's standard coppers, bronzes, brasses, other alloys. The American Brass Co.

159 Stainless Steel Handbook—To provide more complete on-the-job reference data, company's previous edition has been rewritten and augmented. In its 120 pp this cloth-bound text discusses 40 types of stainless steel from standpoints of analysis, fabrication, heat treatment and special service conditions. First chapter provides selector table covering 30 steels, giving physical data, electrical properties, heat resistance, working and treating temperatures, also tables listing corrosion resistance to various media. Other chapters discuss various steels in more detail. Book is available to qualified plant engineers, please state your title. Allegheny Ludlum Steel Corp.

160 Creep Stress of Tubing Steels—Technical information of value in selection and use of equipment operating at high temperatures and pressure is given in Data Card 102 which provides creep stress figures for a number of tubing steels. Data given for rates of 1 per cent elongation in 10,000 and 100,000 hr at temperatures from 900 to 1500 F for 16 popular steels. The Babcock & Wilcox Tube Co.

October, 1951

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161 Steel Stock List—Providing information on company's steels for immediate shipment, this 140-pp booklet also covers engineering services available, trade customs, cutting and shearing charges, and is thumb-indexed and compiled for easy ordering. Plates, sheets, beams, channels, bars, strips, boiler tubes, heavy hardware and other forms are included along with sizes, weights, prices. A section of useful engineering data includes tables of constants, steel color chart, AISI and SAE specifications. W. J. Holliday & Co.

162 Die Pressed Forgings—Publication B-9 is a recently revised edition of company's handy reference booklet on copper and copper-alloy die pressed forgings. This 12-pp booklet provides practical comparative illustrations to show what die pressed forgings are, what they can do, what they already have done and what can be expected of them. Contains tabulation of physical properties of copper and copper alloys suitable for forgings. The American Brass Co.

FIRE PREVENTION, SAFETY

164 To Shoot at Fires—This single-sheet bulletin describes a new 1-qt fire extinguisher that's air-pressurized and is aimed and operated like a gun. Extinguisher is for use on both flammable liquid and electrical type fires. American-LaFrance-Foamite Corp.

165 Why the Hat?—To stimulate wearing of protective hats this little 8-pp folder points out importance of adequate head protection by listing representative examples where men have escaped head injuries or even death from falling objects while wearing company's Skullgards. Also covers care of protective hats to prolong their service life, and discusses design features. Mine Safety Appliance Co.

166 Tank Venting Equipment—Bulletin CP-2001, 32 pp, describes an extensive series of tank equipment, gas control and safety devices for the safe handling and conservation of combustible or toxic liquids and gases in the petroleum, chemical, marine, food processing, other industries. Fully illustrated, includes dimensional data, application information. Vapor Recovery Systems Co.

PACKINGS

167 Duck and Rubber Packings—Various types of duck and rubber packings, including low pressure, cross expansion, hydraulic, hollow core, round rubber core and diagonal expansion types, are described in this 8-pp illustrated bulletin. Gives complete service recommendations for each type, lists standard sizes, and gives packaging specifications. Packing Div., Raybestos-Manhattan, Inc.

168 Packing Rings—Engineering data on company's Simsite Graphitic snap rings of non-metallic composition for packing liquid end pistons of reciprocating pumps is provided in illustrated Bulletin R112. Covers properties of Simsite, forms of packing spaces, ordering information needed, installation procedure. Sims Pump Valve Co., Inc.

PRODUCTION EQUIPMENT

169 Retriever Hose Reels—Illustrated Form 809-R stresses advantages of company's retriever hose reels which offer versatility of mounting, keep air lines handy yet out of the way. Special features described, several mounting arrangements pictured. The Wayne Pump Co.

170 Standard Screw Products—Increased interest in standards, rather than specials, has prompted this manufacturer to offer this 10-pp booklet about "Unbrako" standards, telling what they are and the advantages of their use. Gives detailed information on socket head cap screws, self-locking socket set screws, socket set screw points, flat head socket cap screws, shoulder screws or stripper bolts, pressure plugs, square head set screws, and dowel pins. Includes full data on sizes, prices, packaging. Standard Pressed Steel Co.

171 Drill Bushing Reference Book—This unusual 8-pp booklet not only serves as a catalog for company's own bushings, but also provides instant-use cross reference tables covering some 3023 symbols used by other manufacturers. These tables compare their many symbols to ASA standard sizes and specifications. Covers headless and head press fit bushings, slip and fixed renewable bushings, headless liners. Includes dimensions, prices on company's line. Ace Drill Bushing Co.

172 Directory of Rubber Parts—This 12-pp catalog describes company's manufacturing facilities, including a new rubber compounding mill, and products and services offered. Illustrated with photos, covers products for automotive, aircraft, electrical, chemical and metal industries, including sheet rubber lined tanks and form-dipped rubber parts, also molded and extruded products. Automotive Rubber Co., Inc.

173 Motors for Your Product—Bulletin MU-94 presents briefly advantages of company's line of motors for use in motor-driven equipment and lists location of more than 35 branch offices. Capacitor start motors for use where capacitor start fractional horsepower motors are desired are described. Wagner Electric Corp.

DUST COLLECTING

174 Wet Method Dust Collection—Besides presenting company's line of Multi-Wash dust collectors, dewatering tanks and pumps, 20-pp Bulletin 510 explains advantages of wet method of dust control, discusses both simple installations and those requiring additional equipment. Covers in detail the widely used Senior collector, the Junior collector for single function operations, settling and dewatering equipment, also pumps and separators. Pictures and describes 24 installations. Lists literature available on dust collecting equipment. Claude B. Schneible Co.

175 Dust Collectors—Illustrated Bulletin 510 introduces manufacturer's Series 18 Aeroturn designed for greater recovery of dust particles at higher filtering rates. Stresses six major advantages of this collector, lists applications, gives dimensions. Discusses use of filtering felt, reverse air jet cleaning apparatus, other features contributing to collector's high efficiency. Turner and Haws.

GOOD RECORD KEEPING

176 Need Strings on Your Fingers?—Visible tip follow-up folders allowing fast action after one glance are the subject of this 12-pp booklet. The visible index label shows what records are inside folder, while the colored signal flashes the next due date. Folders can be adapted to production, scheduling, purchase orders, maintenance, etc.; their use in present filing systems makes a separate follow-up file unnecessary. Management Controls Div., Remington Rand Inc.

177 Cost of Burned Records—Pointing up the pitfalls of inadequate record protection, this 8-pp folder cites fate of plants whose records have gone up in smoke. Emphasizes shaky position of trying to collect fire insurance and accounts receivable or resist unjust claims. Lists those "pieces of paper" which are lifeblood of any business. Shows equipment and methods available to insure protection. Management Controls Div., Remington Rand Inc.

OTHER EQUIPMENT

178 Industrial Engines—Illustrated Bulletin IR49602, 6 pp, provides general description, dimensions, specifications and accessory details on manufacturer's R-600 series of gasoline overhead valve engines with open or closed power units. Discusses recommended uses for these engines of 65-110 shaft hp for continuous duty, 75-140 shaft hp intermittent duty. Continental Motors Corp.

179 Silica Cement — This bulletin describes a super-duty silica cement for use in laying silica refractories. This heat-setting cement corresponds in refractoriness and in chemical and physical properties with quality silica brick and is recommended for poured or trammeled joints. Includes photos showing results of comparison tests between company's Vega Bond and other silica cements, including effects of heat treatment, refractoriness, troweling and settling. Harbison-Walker Refractories Co.

180 Mounting Felt—An easy way to choose right grade and weight of vibration mounting felt is described in "How to Reduce Vibration," 20 pp. This little booklet explains economy of good felt, tells how it absorbs vibration, where it's used to advantage. Includes list of engineering data sheets available on felt. American Felt Co.

181 Industrial Cork Products—This illustrated bulletin describes characteristics and uses for cork compositions and natural cork. Includes tables giving physical properties of both types, sheet sizes and manufacturer's equivalents of government specifications for cork compositions and standard taper cork sizes. Various cork products are pictured. Dodge Cork Co., Inc.

182 Military Packing Guide—This 36-pp pocket-size bulletin outlines government packaging specifications involving flexible protective barriers against water, weather, moisture, mildew, corrosion. Presents comprehensive information on current Army, Navy and Air Force requirements in simple language. More than 30 JAN, AN, MIL, UU and other specifications are mentioned and cross-indexed. Types of packaging and procedures illustrated. Mehl Mfg. Co.

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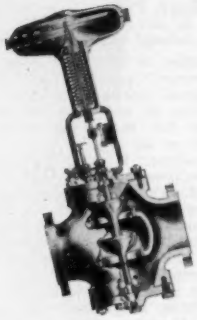

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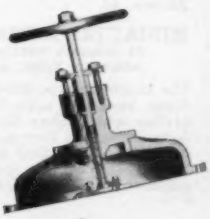

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Sizes in double port style ½ inch to 16 inches; single port ½ inch to 4 inches. Pressure ranges are 125 to 5000 psi, within body limits.

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BARBER-COLMAN COMPANY
103 MILL STREET, ROCKFORD, ILLINOIS

(Continued from page 117)

punched as required. Tools for slipping on the sleeve markers are available, and there's a threading device for looping cord through holes in flat-type markers. Bakelite Co., Div., Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

CONVERSION SET

Adapts screw operated pullers to hydraulic puller

The Y-150 Conversion Set consists of company's 17½-t Power-Twin Ram and Pump assembly plus adapter parts. It converts to hydraulic power most of company's industrial and diesel sets, all refrigeration sets. Owatonna Tool Co., 446 Cedar St., Owatonna, Minn.

SOLDER POT

Is self-contained, with rheostat, manual control for temperature

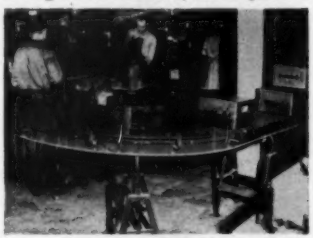
Operating on 117 v a-c (nominal) the Hi-Temp Dipping Pot brazes formvar or enamel insulated wires without prestripping or pre-cleaning. It is designed for high temperature silver solder or 50-50 lead solder dipping applications. It insures perfect joints and reduces rejects, manufacturer says, and there's no need for keeping the temperature on "low heat" during nonuse hours because the crucible, having a useful life of over 300 hr, won't crack when the heat is turned off, even if not emptied.

Unit is equipped with a 5-amp fuse and 66-in. rubber-covered connecting cord. It weighs 32 lb. Catalog sheet available. Tartak-Stolle Electronics, Inc., 3970 S. Grand Ave., Los Angeles, California.

ROLLER CONVEYOR

For gravity or hand propulsion of cartons, boxes, packages, crates

Designed to overcome almost any installation problem, this conveyor has only three units: straight sections, 90-deg curved sections, and adjustable



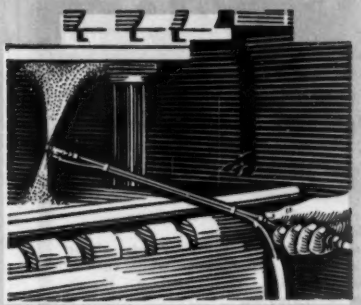
trestles. Balanced rollers rotate on full length cold rolled steel shafts fitted with ball bearings. Shafts retain alignment and cross channels are provided to prevent frame from spreading under loads. Rollers are spaced on 4-in. centers and are raised ⅜ in. above frame to accommodate packages wider than conveyor. Lyon Metal Products, Inc., Aurora, Ill.

MINIATURE NOISE METER

Is compact instrument with sub miniature tubes and components

The improved Type 410-B Sound Level Meter measures noise, sound and vibration which often have harmful effects on human nerves, efficiency and hearing. It's described as accurate and rugged, and offering greater low frequency range, electrical circuit im-

NO SMOKE... NO FUMES in Hot Forging with... "dag" Colloidal Graphite



"Dag" colloidal graphite dispersed in water eliminates smoke and fumes in hot forging operations . . . greatly improves working conditions. The lubricating properties of colloidal graphite are superior, too, giving increased production . . . reduced die wear . . . better finish . . . and usually a saving in steel stock.

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provements and mechanical design improvements.

The sound-level range is from 34 to 140 db above standard ASA reference level of 0.0002 dynes per sq centimeter, according to company. Hearing-aid batteries used with it have an operating life of about 50 hr. Bulletin on request. Hermon Hosmer Scott, Inc., 385 Putnam Ave., Cambridge 39, Mass.

CURRENT TRANSFORMERS

Are butyl molded units for both indoor and outdoor use

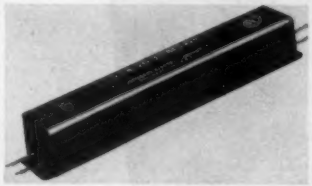
Introduced earlier for indoor current transformers, the butyl-molding process is now being applied to a line of 600-v current transformers which can also be used outdoors, on single-phase and polyphase circuits. Company engineers say the main problems associated with use of butyl on outdoor transformers—water penetration, sealing of butyl to metal parts, and surface creepage—have been overcome. The butyl insulation combines low moisture absorption, good corona and sunlight resistance, good adhesion to copper, low power factor and resistance to mechanical damage. And by using butyl the more costly porcelain and metal cases are eliminated. The molded insulation also permits compact designs meeting standard dimensions for indoor applications and is waterproof for outdoor service.

First of the line is Type JKP-O a 600-v window type current transformer with primary ratings of 200-, 400- and 600 amp. It is designed to carry 200 per cent of rated primary current continuously. Meter and Instrument Dept., General Electric Co., Schenectady 5, New York.

SERIES SEQUENCE BALLAST

Is designed for positive starting on line voltages as low as 106 v

Rated lamp life and rated light output of company's Model 96T12 fluorescent lamp for series operation is said to be assured by the Series-Sequence Ballast



254-511. Based on a new concept of ballast design, this series-sequence ballast is designed for positive starting on low line voltages without detrimental effect on lamp life. Variations in voltages have no noticeable effect on lamp brilliancy, company says, and construction and simplified core design permit maximum lamp wattage with temperature rise well under ASA limit, and eliminate audible hum. Jefferson Electric Co., Bellwood, Ill.

LINE CLEARING TOOLS

Are air powered and insulated against electrical shock

These special insulated models of company's Limb-Loppers and other tools designed to provide utmost safety against electrical hazards for line clearing crews. Single-piston and powerful double-piston models are now available. Standard lopper is 6 ft 8 in. long, weighs 9½ lb and has a cutting capacity of 1¼ to 1¾ in. The heavy duty model is over 7 ft long, weighs 11 lb 6 oz and cuts limbs up to 2½ in. dia. Extender units, 48 in. long, are also available. All of these pneumatic tools can be operated from any self-contained power source or power take-off compressor with capacities of 17 to 30 cfm, 125 to 150 psi. Miller-Robinson Co., 7007 S. Avalon, Los Angeles, Cal.

SPEED CONTROL SYSTEM

For operation from polyphase or single-phase a-c circuits

Fundamentally a Ward-Leonard system of speed control, this consists of three units—a motor-generator set, a controller, and a drive motor, any of which may be mounted any distance from the others and in any position. A single controller provides 16 forward and 16 reverse steps of speed adjustment of 150 rpm each to a total of 2400 rpm and provides full dynamic braking. A vernier rheostat may be connected in the circuit if finer adjustment is required.

Each rotating unit is of company's Streamcooled design and glass insulation is used, where practical, to provide compactness and minimum maintenance. Exitation is by a full-wave rectifier of the Tungar type. Sizes are ¾ through 3 hp for operation from polyphase circuits and through 1½ for operation from single phase circuits. Baldor Electric Co., 4353 Duncan Ave., St. Louis 10, Mo.

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1000, 1500, 2000 LBS.
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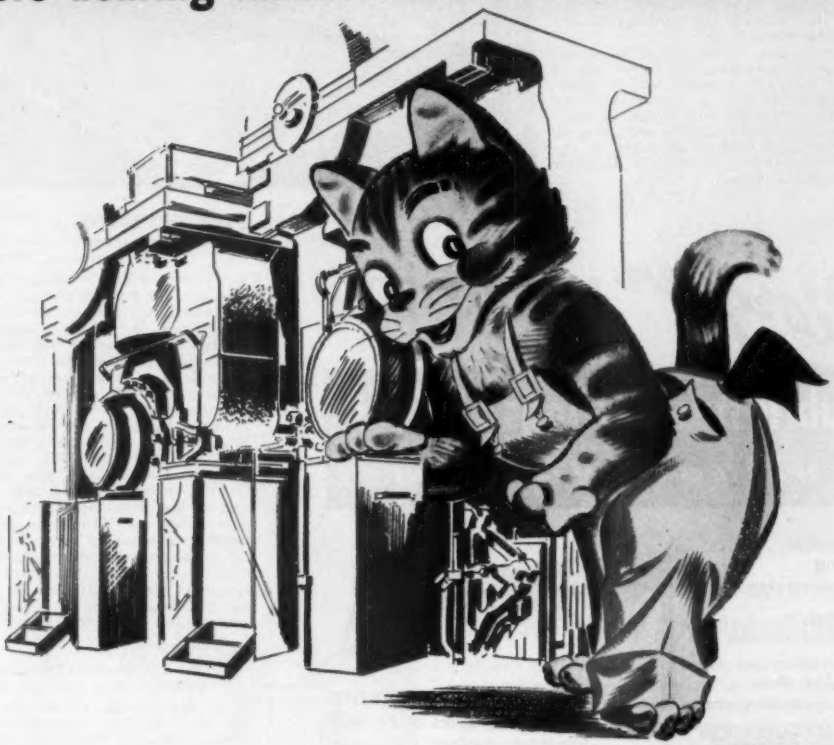

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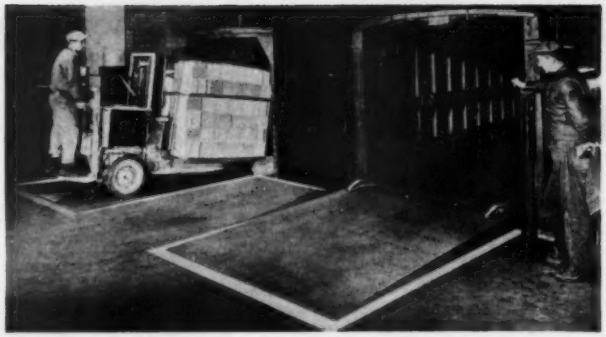
LOADING DOCK RAMP

Has retractable supporting arms and a laterally adjustable throw bridge

The new Leva-Dock is designed for loading materials directly into, or unloading from, all types of trucks or trailers. This ramp hinges into the loading dock and is positioned by hydraulic jack. The platform automatically travels up or down to keep on the same level with the bed of truck or trailer as the truck springs are relieved or compressed.

Said to permit faster loading with less manpower and fewer accidents, the Leva-Dock is built for use with power trucks, and for handling loads up to 10,000 lb. It is operated by an electric power unit which will handle as many as nine Leva-Docks independently controlled. A catalog on the Leva-Dock is available on request from manufacturer. Rotary Lift Co., Box 2177-A, Memphis 2, Tenn.



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Lubricates Bearings & Drives

on 24 ft. assembly of 13 saw ladders

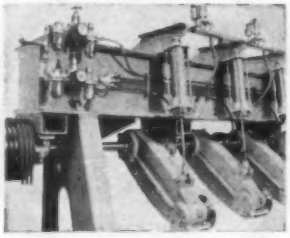
Results after gruelling saw mill service:

1. Bearings in excellent condition
2. Chain drives and sprockets show no sign of excessive wear
3. NO ACCUMULATION OF OIL IN HOUSINGS

The PORTLAND OVERHEAD TRIMMER, product of Portland Iron Works, Portland, Ore., manifolds an oil-fog to 13 saw ladders over distances up to 24 feet.

The problem was to lubricate uniformly each saw ladder without leaving pools of oil in the housings. The Portland Iron Works experimented at length with various airline lubricators and found that Norgren Micro-Fog Lubricators assured faultless lubrication at all vital points.

If you need closely controlled lubrication traveled over long distances to single or multiple air-actuated devices—CHECK ON THE NORGREN MICRO-FOG LUBRICATOR.



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25 YEARS OF HELPING AIR POWER SERVE INDUSTRY BETTER

FIRE DETECTOR

For new or existing installations; "rate compensation" type

The Detect-A-Fire is designed to give an alarm the moment the surrounding air reaches the temperature for which the device is pre-set. Temperature settings to 325 may be had, and areas up to 625 sq ft can be protected by a single unit, manufacturer states.

The fixture fits against the ceiling and is mounted in a curved steel case. Sensing element of the Detect-A-Fire is a stainless steel tube which is always in contact with the air. Hermetically sealed within this tube are silver electrical contacts and expansion of the tube with heating of the surrounding air brings the contacts together to sound an alarm or operate extinguishing equipment. Units are available for normally open or normally closed circuits. The device is designed to re-set itself after each alarm. Fenwal, Inc., Ashland, Mass.

LIMIT SWITCH

For use wherever lightness, compactness, long life are required

As a direct-acting switch, the du.op has no inherent characteristics of bounce, according to manufacturer, and mechanical lost motion, which would delay contact operation, is eliminated because instantaneous contact is made at the same fixed point of repetitive plunger travel. The centrally-located plunger acts directly on the long contact spring to insure contact transfer with maximum spring pressure.

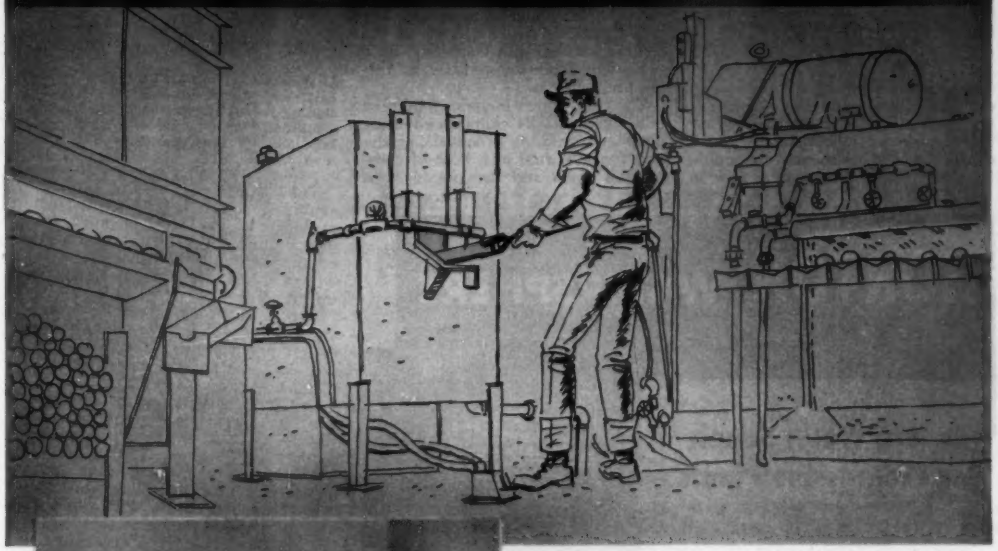
Each contact blade is a solid piece of metal riveted to terminals to reduce electrical resistance. Contact arrangement is single pole, double throw, spring return and handles up to 20 amp, 125 v a-c, non-inductive. The du.op is enclosed in a phenolic-molded housing with same 1-in. mounting dimensions as snap-action switches. General Control Co., Boston 34, Mass.

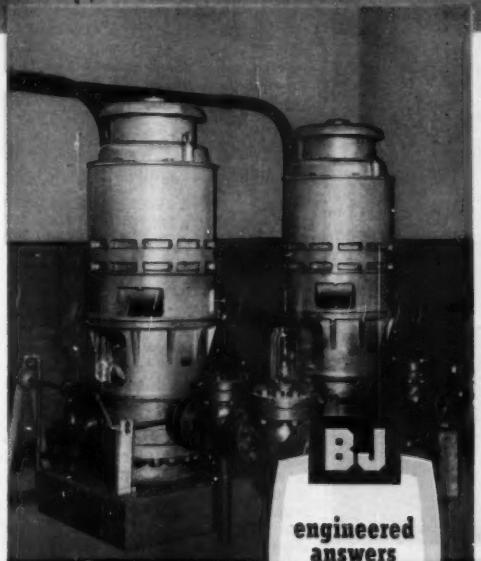
DEMINERALIZING UNIT

Mono-bed type, available in flow rates up to 5000 gal per hour

This demineralizer operates on the mono-bed principle in which cation and strong base anion exchangers are intimately mixed in a single unit tank —providing in one container the equivalent of several multiple bed systems. Raw water goes through the mono-bed column only once, company explains, comes out with mineral content of virtually zero. Penfield Mfg. Co., Inc., 19 High School Ave., Meriden, Conn.

KNOCKS OFF SCALE IN 1½ SECONDS!





This automobile plant uses two BJ Hydropress Pumps for descaling. One pump services as many as 10 cabinets (with 5 operating at once).

Auto industry uses BJ Hydropress Pumps to descale forged parts hydraulically!

Manual or mechanical descaling operations are time-taking and profit-robbing. Especially when a product requires several descalings during production. You'll save time, money and rejects by descaling hydraulically with BJ Hydropress pumps.

Here's one of the many examples of modern hydraulic descaling as used by the automotive industry. During the heating of axle bars prior to forming, scale is created and must be removed. This is done in a hydraulic descaling cabinet. As the bar is inserted, a lever is tripped and high velocity water at 1500 to 2000 psi hits the bar from 3 to 5 nozzles. Scale is removed in 1½ seconds! Afterwards the hot bar is placed on a forming roll.

The BJ Hydropress pump is ideal for this type of work because of its unique construction features. It does not require relief valves, accumulators or extra heavy fittings and piping. Its double volute design creates inherent balance at all heads and capacities. Its vertical construction allows the use of a simple foundation and a minimum of floor space.

For more information call your local BJ sales engineering office or write:

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Sales Offices in Principal Cities

NEW BOOKS for the plant engineer's library

Fuel Oil Facts

FUEL OIL MANUAL by Paul F. Schmidt. Size 6 by 9 in.; 160 pp; flexible binding. Published by The Industrial Press, 148 Lafayette St., New York 13, N. Y. Price $3.50.

COVERED IN THIS book are complete data on the properties of fuel oil, the possibilties and limitations of each grade of oil, methods which can be used to assure uniform quality and efficient combustion, how to diagnose fuel oil troubles and how to remedy them. All this adds up to getting the maximum value from each fuel oil dollar. Under Troubles and Remedies are listed 22 of the common fuel oil troubles, their symptoms, and the remedy to follow in each case.

The text, which includes 34 tables, is divided into 24 chapters covering petroleum refining processes, grades and types of fuel oils, heat of combustion, flash and fire points, pour point, preheating of oils, sampling storage tanks, fuel oil treatments, reclaimed fuel oils, blending of oils, transportation and storage, fuel oil specifications, and others.

The book is the result of years of experience in trouble shooting and should prove helpful to engineers interested in fuel data.

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Piping Particulars

INDUSTRIAL PIPING by Charles T. Littleton. Size 6 by 9 in.; 394 pp including index; illustrated; cloth bound. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. Price $8.00.

THIS BOOK describes the methods commonly used for solving such problems as the sizing of pipes, the determining of pressure drop, and others. It features a listing of valve equivalents in the pressure classes up to 600 lb.

All pertinent data and methods suitable for each type of piping service are presented in individual chapters that discuss the flow calculations, preferred materials, fittings and valves for that particular service. This coverage includes steam, water, oil, gas, air and instrument piping.

A special chapter Estimating Piping Costs, contributed by R. A. Dickson of Standard Oil of New Jersey, describes the N factor system that he has developed. It is accurate to within 8 per cent (plus or minus) of a detailed cost estimate and is said to eliminate many routine calculations.

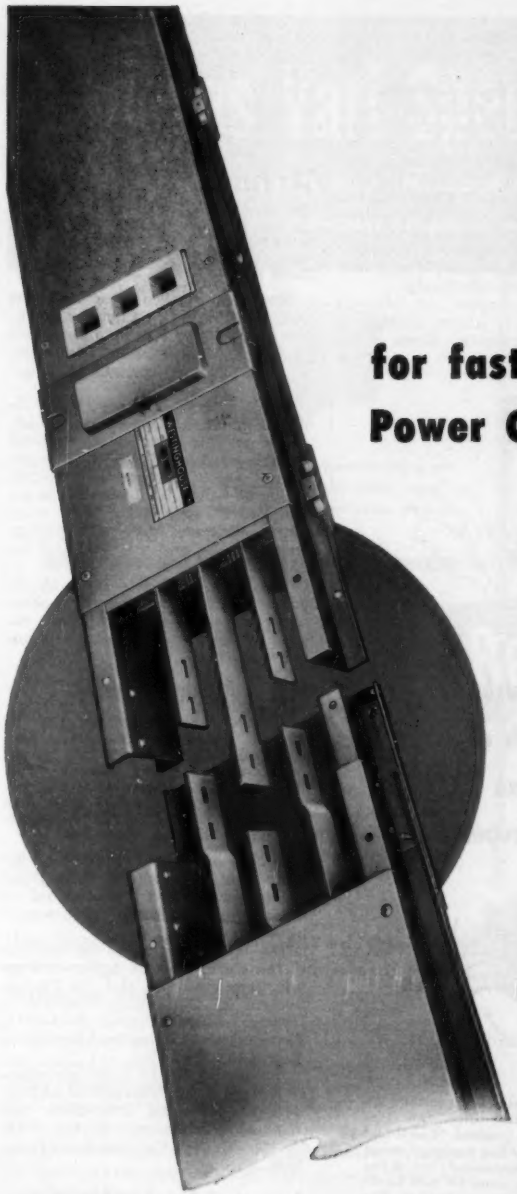
Packaging Steel Products For Domestic Shipment

PACKAGING, MARKING AND LOADING METHODS for Steel Products for Domestic Shipments. Size 6 by 9 in.; 363 pp; illustrated; stiff paper binding. Published by American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y. Price $1.00.

THE METHODS illustrated in this manual reflect the results of years of experience this institute has acquired in delivering steel products satisfactorily by various methods of transportation.

Various steel products are covered, explaining the proper packaging, marking and loading methods which should be followed in each case. Some of those covered include: carbon steel plates, hot rolled carbon steel bars, carbon steel sheets, hot rolled carbon steel strip, tin mill products, steel tubular products, stainless and heat resisting steels, and many others.

This manual is the second step of the plan proposed by the Committee on Packaging and Loading: the first phase to cover commercial overseas shipments; the second, domestic shipments. The first phase is covered in a separate manual published by



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the U. S. Department of Commerce. as Simplified Practice Recommendation R-237-49. Copies may be obtained from Superintendent of Documents, Government Printing Office, Washington 25, D. C., 40 cents a copy.

Management Engineering

PRODUCTION AND INVENTORY CONTROL by William E. Ritchie. Size 6 by 9 in.; 273 pp; illustrated; cloth bound. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N. Y. Price $5.00.

THIS TEXT ON management engineering avoids the other engineering and manufacturing activities involved in running a plant and centers on the systems required to control production operations and inventory levels, under various manufacturing conditions.

A chapter on analysis emphasizes the use of factors which are present in any industrial situation and, in its treatment, does not rely on any arbitrary or synthetic frame of reference. This is followed by four chapters which deal with forms of organization and control procedures, in which stress is laid on the variety of possibilities which are available and the conditions under which each can be used most effectively.

In another chapter, an over-all picture of twelve control systems in use today is presented. Some of the companies whose systems are explained were chosen because their systems were similar in many respects; others because the systems were sharply different. None of the systems are pointed as examples of the ideal, but they exemplify certain features discussed.

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Two Plus Two Equal Four

ENGINEERING FORMULAS AND TABLES. Size 5 by 7¼ in.; 176 pp; loose leaf binding. Published by Lefax, Sheridan Building, Philadelphia 7, Pa. Price $1.50.

HERE IS A revised loose leaf data book containing mathematical tables and formulas to help you solve problems in arithmetic, geometry, algebra, trigonometry, analytical geometry and calculus.

The material is arranged in thumb-indexed sections for ready reference. The sections cover: mathematics; measures; materials; gages, screws, etc.; mechanics; electric, magnetic and fundamental units; hydraulics; structural data; reinforced concrete; pipe and fittings; steam tables; and mathematical tables.

This loose leaf data book should prove helpful in solving any mathematical problems you may have regarding the many phases mentioned above.

Pressure Piping Standard

CODE FOR PRESSURE PIPING by Section Committee B31, No. ASA B31.1-1951; Size 8½ by 11 in.; 101 pp; illustrated; cardboard binding. Published by The American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. Price $3.50. (Order through Publication Sales Dept.)

THIS IS THE latest revision of the Code that is accepted throughout the power field as the standard of design and operation of pressure piping.

The book contains all the sections of the Code: Section 1, Power Piping; Section 2, Gas and Air Piping; Section 3, Oil Piping; Section 4, District Heating Piping; Section 5, Refrigeration Piping; and Section 6, Fabrication Details.

Included with the Code is a separate copy of the Standard Qualification for Welding Procedure and Welding Operator, Section IX, ASME Boiler Construction Code, 1949 Edition.

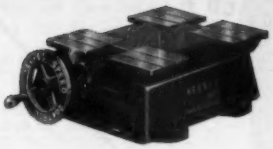
Science of Sound in Liquids

ULTRASONICS by P. Vigoureux. Size 6 by 9 in.; 163 pp; illustrated; cloth binding. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $4.00.

FOR THOSE WHO wish to explore the more theoretical aspects of ultrasonics, this book should prove very useful. However, considerable knowledge of mathematics is necessary to use it.

Reeves Vari-Speed Motor Pulley

converts any standard constant speed motor to a low-cost stepless variable speed drive . . .

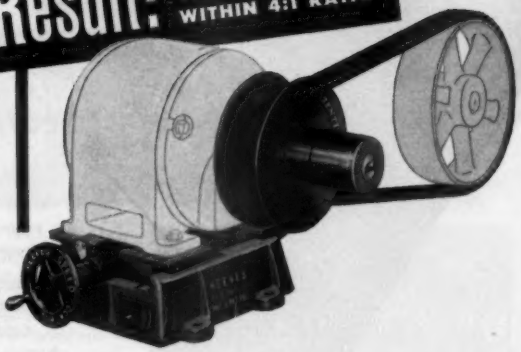


1. REEVES Motor Base provides sliding platform for motor. Handwheel or push-button control increases transmitted speed by moving motor toward driven machine, decreases speed by reversing the operation.

2. Disc Assembly connects directly to motor shaft. Assembly consists of two facing cone-shaped discs—one sliding laterally—and compression spring for mounting as a single unit on motor extension shaft.

3. Special V-Belt hooks up unit with driven machine. Belt fits between discs and over pulley on power input shaft of driven machine. Belt is adjusted to minimum center.

Result: INFINITELY VARIABLE SPEED WITHIN 4:1 RATIO



Unit instantly delivers any desired speed over entire range and maintains that speed without fluctuating even a fraction of an rpm.

The REEVES Vari-Speed Motor Pulley is the easiest, lowest-cost method of converting a machine with fixed speeds into a highly versatile unit of infinitely variable speed adjustability. Thus equipped, it can handle a wider range of work, better, faster and more economically, because machine speed can be changed instantly and accurately—without shutdowns—to meet the needs of every operation and every operator, *under every changing condition.*

This REEVES unit forms the actual driving element between motor and driven shaft . . . eliminates all auxiliary equipment such as chain drives, gears, belts, etc. . . . requires virtually no more space for installation than any standard belt or chain drive. It is built in eleven sizes, transmitting from ⅛ to 10 hp., over speed ratios from 2¼:1 to 4:1, inclusive.

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REEVES units have proved their ability to speed production, cut cost and increase profit in more than 300,000 widely diversified industrial applications . . . are listed as standard equipment on over 2,100 different makes of modern machines.

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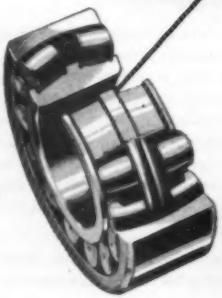

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Ultrasonics is the science of propagation of sound in liquids and gases at frequencies higher than are audible to human beings. The waves used are true sound waves and are not the same thing as various types of electrical vibrations.

This book first discusses the methods of generating these waves, then takes up the ways in which they are propagated through gases and liquids. Next, the author takes up the various ways in which ultrasonic energy can be detected and measured. Finally, he describes in detail the action of ultra sound in both gases and liquids.

Utilization of Waste Material

INDUSTRIAL WASTES by Charles H. Lipsett. Size 6 by 9 in.; 317 pp; cloth bound. Published by Atlas Publishing Co., 425 W. 25th St., New York 1, N. Y. Price $5.00.

THIS BOOK IS intended to give the reader a general knowledge of the over-all picture of the production and utilization of waste material. The author has tried to use as little technical language as possible so that the average layman may understand the general processes. References are given at the end of each chapter so that those who want the full technical details may look them up in other textbooks and principally in the magazine literature of the various fields.

In order, the various chapters of the book discuss plastic scrap and its recovery, chemical wastes, glass scrap, all sorts of metal scrap, leather and wood waste, wastes from fruit, rubber, organic materials, grease, textiles, cotton wastes, woolen wastes, paper making wastes, and others. Data are given on what the wastes consist of and how they may be recovered.

On Flow of Liquids and Solids

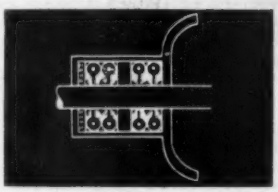
VISCOSITY AND PLASTICITY by E. N. da C. Andrade. Size 5½ by 9 in.; 80 pp; cloth bound. Published by Chemical Publishing Co., Inc., 212 Fifth Ave., New York, N. Y. Price $2.25.

THREE LECTURES on the phenomena of viscosity and plasticity are outlined in this book. The subject is covered with a special view to those who deal with viscous and plastic materials on an industrial scale, and especially to paint technologists.

Lecture I discusses the nature and theories of liquid viscosity. It aims at establishing general principles and deriving from these an understanding of the complex behaviour of flowing liquids and solids.

Lecture II deals with the flow of simple liquids, suspensions and gels. It also considers thixotropy, dilatancy and other properties affecting flow. The flow of solids is the topic of Lecture III. It covers sols and gels which can be poured slowly or with difficulty.

Chesterton 444



Chesterton 444 is full metallic on rod or shaft. It runs frictionless without usual gland pressure. Why? It's due to E-L-A-S-T-I-C back and *built-in oil seal* in each Metallic ring. These special metal rings are soft enough to machine themselves to rod imperfections. 8 to 10 years uninterrupted service is common with Chesterton 444.

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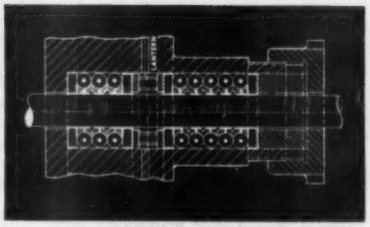

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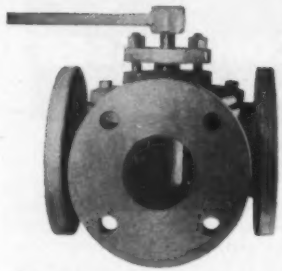


THE HONEYWELL transfer valve is a simple, compact valve designed for diverting flow from one line to another—such as cooling water from one condenser to another or oil from one strainer to another. It replaces two conventional valves and fittings. Operates by movement of single lever . . . no chance of opening or closing both lines simultaneously.

Sizes 1½ to 8 inches . . . straight-way or three-way . . . screwed or flanged. Available in high tensile iron with iron or bronze trim; bronze with bronze trim. Other materials and larger sizes on request. Body ratings 125-150 lbs. ASA facing and drilling. Maximum inlet pressures 30 psi to 10 psi. Cost is low . . . act quickly.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, *Industrial Division,* 1914 Windrim Ave., Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

MINNEAPOLIS Honeywell

Valve Products

Portable Electric Tools

(Continued from page 88)

lubrication, and frequency of attention vary widely, not only from one make of tool to another but also among tools of the same manufacturer.

Frequency of lubrication generally depends on severity of service, and may range from daily to yearly. Some tools require that a few drops of oil be placed in button and cap oilers, or on external moving parts, periodically; some use grease instead of oil; some are equipped with grease cups that are turned down a turn periodically; others have screws that are removed, grease placed in the screw hole, and the screw replaced and tightened, thus forcing lubricant into the bearing.

Some tools are equipped with gear cases that must be kept filled to a certain level with proper lubricant; others are provided with gear cases utilizing semi-solid grease. The latter usually require periodic cleaning and flushing with solvent, such as warm lubricating oil, kerosene, Varsol or carbon tetrachloride, and replenishing half to two-thirds full with suitable new lubricant.

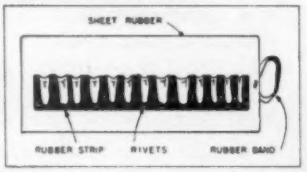
Anti-friction bearings are generally of two types. One type is permanently lubricated at the factory and requires no additional lubrication throughout its operating life. Such bearings are sealed and should never be cleaned with solvent, as this will dilute the lubricant. They may be wiped clean, when necessary, with a clean, lint-free cloth.

The second type of bearing can be distinguished by an open cage assembly. Such bearings require periodic removal of old grease and replacement with new lubricant. Where grit is present, they should be flushed, in the same way as gear cases, to remove all old lubricant and grit, and repacked half-full with a good grade, non-corrosive anti-friction bearing grease.

Tools that have been out of service for some time should be cleaned of old lubricant and re-lubricated before being used, as the old lubricant tends to harden under such conditions.

A suitable lubrication record is essential as a means of insuring long operating life to electric tools.

Homemade Tool Roll



Old inner tube makes handy roll for small tools. Riveted strip holds tools in place and rubber band secures roll

Real Results with ELWELL-PARKER Trucks!

★ "Operating costs 25% less than with any other motive power."

★ "In one full year, not a minute lost due to mechanical failure."

★ "Truck enables four men to be shifted to other jobs."

★ "Trucks have made a high production schedule possible."

★ "Our next truck will be an Elwell-Parker."

These are a few highlights from the success story of E-P trucks at a concrete block plant . . . Elwell-Parkers are saving time and man power in over 300 different industries... E-P trucks are so designed that women can readily operate them . . . 87 models, both battery and gas powered.

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Power Industrial Trucks Since 1906

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NOW! Fill any need for Type A, C, or D switches from one magnificent line of BullDog Vacu-Break Master Switches. End chaos of hundreds of confusing switch catalog numbers . . . work with just 38! Order, stock, install one line. Save time, money, effort.

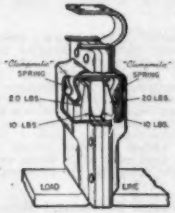
NOW! A great, tested BullDog switch that fills all Type A specifications, yet sells at C prices, to end today's switch turmoil and streamline your use of Type A, C, and D switches! Another great BullDog first!

All the famous BullDog features!

- Vacu-Break principle of circuit rupturing
- Self-aligning Clampmatic Contacts
- Quick-make and quick-break
- Anti-creepage corrugations on switch bases and arc chambers
- Solderless cable terminals (wire grips)
- Horsepower-rated
- Silver-surfaced current-carrying parts
- Voidable cover interlock
- Spring-reinforced fuse grips
- Ample supply of concentric K.O.'s
- Generous wiring space in all switches

EXCLUSIVE CLAMPMATIC CONTACTS!

"Clampmatic" is a method for obtaining extra and enduring contact pressure between switch jaws and blades. Clampmatic provides a total of 30 lbs. of contact pressure between both sides of blade and jaw for "bolt-tight" contact.



EXCLUSIVE VACU-BREAK PRINCIPLE!

Dangerous arcs are quickly snuffed out by lack of oxygen in BullDog's exclusive Vacu-Break arcing chamber. This eliminates excessive arcing which, in ordinary switches, causes burning, pitting and rapid deterioration of contacts.

VOIDABLE COVER INTERLOCK!

Interlock: With interlock pin at Hole A, cover cannot be opened unless switch is OFF. Cover must be fully closed to throw switch ON.

To void interlock: Simply push interlock up and insert interlock pin in Hole B. Switch can then be thrown ON or OFF with cover open or closed.

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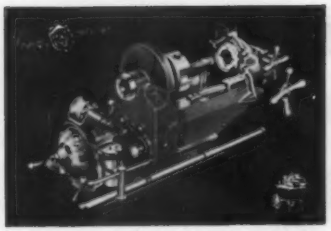

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Performance is what counts in a pipe machine . . . and, successful performance is always news . . . year after year.

Beaver Model-A Pipe and Bolt machine gives you quick, clean threads, precision cutting and reaming. It is right handed with all controls in front. You get 50% greater working space, gear driven power in abundance, and a full range from ⅛ to 2 inches.

Reversible Universal motor, safety "shear pin," rack and pinion feed, self-centering wheel and roller cut-off, heavy duty chuck, adjustable opening die heads, interchangeable die segments and an easily accessible oil pump . . . all add up to top performance.

For more information on successful pipe tool operation . . . write for catalog on the BEAVER line today.

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DATA FILE

of literature for the plant library

STANDARD CATALOGS, bulletins and handbooks are listed to aid plant engineers in maintaining a permanent, up-to-date data file. For copies of these, write the number preceding the desired bulletin on the card in the heavy insert, pages 45-46 and 119-120.

CONSTRUCTION

201 Roofing Manual—Engineering data on roofing is given in Specifications 50, 30 pp. Covers coal tar pitch roofings, waterproofings, insulations, flashings, protective coatings. Includes illustrated instrutcions. Tar Products Div., Koppers Co., Inc.

202 Building Panel Engineering Data—This 40-pp reference book on use of steel and aluminum panels for walls, decks and roofs, discusses their use, advantages, methods of installation. Covers acoustically treated panels, fire resistance ratings, electrification, acoustic roofs, reinforcing floor forms. Fenestra Building Products Co.

203 Glass Block and Where to Use It—This 32-pp book gives design data, information on functional and decorative aspects of glass block. Covers properties, specifications, erection procedures. Insulux Div., American Structural Products Co.

204 Technical Data on Plexiglas — This is a file folder of information on Plexiglas sheets, rods, molding powders, covering workability, properties, thicknesses. Discusses large area lighting. Rohm & Haas Co.

205 Building Construction and Maintenance Manual—Here's a 112-pp illustrated manual packed with facts on concrete and wood floor treatments, paints, protective coatings, concrete and mortar admixtures, waterproofing and dampproofing, caulking compounds, and roof coatings. Provides estimating guides on floor treatments and roof coatings, brick requirements, timber requirements and water-cement ratios. L. Sonneborn Sons, Inc.

206 Technical Manual on Plywood—Available basic data on Douglas fir plywood, its properties and use, are offered in looseleaf sections with firm binder. Presents engineering information about this panel material and its performance in varying applications. Covers commercial standards, designing with plywood, prevention of condensation, lateral bearing strength of nailed plywood joints, deflection. Please give your title when requesting this book. Douglas Fir Plywood Assn.

207 For Faster Fastening — Form 35-A explains and illustrates company's system of fastening tools and fasteners for use with steel, wood, concrete, fabricated hard materials. Ramset Fastening System, Inc.

MAINTENANCE

208 Drip Preventive Handbook — Insulation of pipelines, tanks, cold air conditioning ducts and wall surfaces against corrosion and condensation drip is covered in pocket-size 32-pp Form F-17. Describes coatings, tells how to apply. Includes coverage tables. J. W. Mortell Co.

209 Painting with Aluminum — Form AD-228, 28 pp, tells how and where to use aluminum paints. Covers painting of metal, concrete and masonry and other non-absorbent surfaces; of weather-exposed wood, and of interior heated surfaces. Aluminum Co. of America.

210 Iron Cement Handbook — This is a 40-pp pocket-size catalog of iron cements for repair, other uses. Tells how to mix and apply them. Gives illustrated instructions for dozens of repair and maintenance jobs. Smooth-On Mfg. Co.

211 Building Maintenance — Handbook 7 offers 64 pp of information on floor surfacings, leak stoppers, external wall sealants, road patching, roofing materials. Includes instructions for use. Flexrock Co.

212 One-Coat Insulation — This 32-pp booklet describes company's Type D insulation, a sprayed-on coating for surfaces with temperature range from —40 to 300 F. Tells how one application of this coating not only insulates but also waterproofs, rustproofs, deadens sound, prevents condensation and resists fire. Tells how to apply, discusses K factor, bonding properties; describes specific uses—tank surfaces, heat ducts, metal surfaces of large buildings. Insul-Mastic Corp. of America.

213 New Floor in Minutes — This folder describes an instant-use, ready-mixed plastic patching or resurfacing material which can be applied after wire-brushing broken concrete or worn portion. Dura-Tred Co.

214 Floor Maintenance—This 12-pp brochure presents a complete and economical program for the care of wood and concrete floors, terrazzo, linoleum and tile. Points discussed include wear resistance, appearance, sanitation, cleanliness, light reflectance, sealers and hardeners, burnishing and buffing, waxing, and painting of concrete floors. The Tremco Mfg. Co.

"Well, Brainy, where is the mortar?"

215 Corrosion-Preventive Coatings—This 16-pp illustrated booklet covers a family of products for fighting corrosion. Presents characteristics and application data on hot and cold applied tar base coatings, alkyd resin coatings, chlorinated rubber base coatings, vinyl and phenolic coatings. Includes finder chart. Protective Coatings Div., Pittsburgh Coke & Chemical Co.

216 For Floors That Take Beatings—Twelve-pp illustrated booklet, "Why Engineer an Industrial Floor," points out why installation of industrial floors for maximum life and minimum cost is a task requiring experienced planning, skilled execution and exacting cost control. Describes how floors can be engineered to withstand moving and deadweight loads, shock and vibration, extreme temperatures, oils, greases, chemicals and industrial wastes, etc. Flash-Stone Co., Inc.

217 Why Good Cement Floors—Importance of quality concrete floors and factors involved are explained in this 8-pp bulletin. Discusses installation procedure and maintenance of company's cement flooring, its durability, other advantages, use for resurfacing as well as for new installations. Kalman Floor Co., Inc.

PUMPS, COMPRESSORS

220 Centrifugal Pump Care—Sixteen-pp Bulletin 06X6256A is a handbook on the care of all makes of centrifugal pumps. Tells how to figure head, determine friction loss. Discusses causes of troubles and

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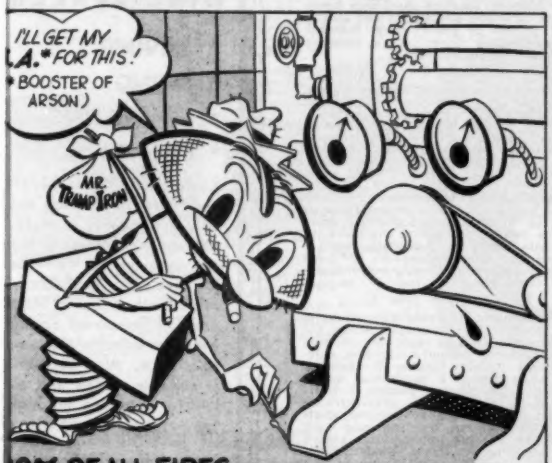

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51-J

SLY

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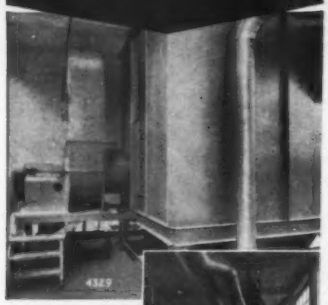
DUST CONTROL



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their cures, includes maintenance time table. Tells how to prevent cavitation, common mistakes in packing stuffing boxes. Allis-Chalmers Mfg. Co.

221 Centrifugal Pumps — Single- and two-stage pumps for small boiler feed service, cooling tower service, bottle washing, brine circulation, general water service, hot well service are described in Bulletin W-306-B1. Includes ratings. Worthington Pump and Machinery Corp.

222 How to Solve Pumping Problems— Form 3060 is a 130-pp manual on selection, use of pumps. Tells type of pump construction best suited for handling 150 liquids. Explains how to determine size, compute suction list and discharge head, determine direction of rotation and size of speed of pulleys or gears. Gives instructions for installing rotary pumps, locating trouble. Geo. D. Roper Corp.

223 Air Compressors — Twenty-pp Form 834, a catalog on air compressors, includes selector charts and case examples to facilitate choice of right model. Describes and illustrates single- and two-stage, vertical and horizontal types, also models for low pressure service. The Wayne Pump Co.

224 Multi-Stage Compressors — Featured in 36-pp Bulletin 116 is a presentation of engineering data and performance characteristics to enable plant engineers to approximate power requirements, rotative speed and discharge temperature for most multi-stage centrifugal compressor applications. Clark Bros. Co., Inc.

225 For Abusive Pumping Jobs—Catalog 4906, 36 pp, covers centrifugal pumps for wide industrial use and especially adapted to handling ashes, abrasive mixtures, slurries, hot and corrosive liquids. It describes several basic types; a horizontal shaft, single-stage side suction pumps; a horizontal shaft, single-stage, rear-entrance automatic priming pump; vertical shaft pumps with standard, overhead and quill bearings for wet pit applications, and a vertical shaft dry pit pump. Nagle Pumps.

226 Centrifugal Pumps — Described and illustrated in Bulletin 50-9900 are a cross section of an extensive line of centrifugal pumps. Includes heavy-duty Bilt-on pump, a pneumatic sponge pump, deep well and submersible pumps, also boiler feed process, stuffingboxes, and sump pumps. Byron-Jackson Co.

227 Rotary Pumps—The operating principle, advantages, construction features and range of applications of standard, heavy duty and special rotary pumps are explained in illustrated Bulletin 51-S. 8 pp. Includes dimensions. Viking Pump Co.

228 Stainless Steel Pumps — Centrifugal pumps described and illustrated in 8-pp Bulletin 725.3 are designed for handling corrosive liquids. Pump design is explained and parts identified. Specifications, dimensions included. Goulds Pumps, Inc.

229 Condensation Return Units—Bulletin 113-ST describes and illustrates packaged condensation return units for small, low pressure uses, covering pump capacities of 1½ to 22½ gpm. Aurora Pump Co.

PACKINGS, SEALS

230 Data on Packings—Form 428 is a collection of bulletins on flexible metallic packing, semi-metallic packing, rotary mechanical seal, oil pressure system and steel packing tools. Durametallic Corp.

231 Mechanical Seals for Rotary Shafts —Illustrated with cutaway drawings, this 12-pp booklet covers seals of the positive, chevron, and o-ring types, gives specifications. The Garlock Packing Co.

232 Buyer's Guide on Packings—Twenty pp Catalog PC-101 brings together all material on company's Palmetto packings and includes data on packing for liquid pistons on inside-packed piston pumps. Self-lubricating, molded and special packings covered. Greene, Tweed & Co.

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MAINTENANCE FOR METAL 142-1

THE DAMPNEY COMPANY

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233 **Long Wearing Piston Packing** — Form 4502, 8 pp, presents composition cups for packing pistons of air and hydraulic cylinders and reciprocating pumps. Engineering information covers properties, textures, temperature and pressure data, sizes. Darling Valve & Mfg. Co.

234 **Metallic Packing**—This folder is devoted to company's elastic metallic packing intended for frictionless operation by means of an oil seal. Photos and text tell how seal is constructed, operates and is used in compressors, engines, pumps. A. W. Chesterton Co.

FUELS, LUBRICATION

235 **Viscosity of Fluids**—The larger significance of viscosity is discussed in Nos. 5 and 6, Vol. 36 of Lubrication, a technical publication. Illustrates simplest conception of streamline flow between two surfaces having relative motion. Shows how viscosity is measured. The Texas Co.

236 **Lubricant Data Book**—This pocket-size 56-pp booklet gives product information and principal uses of approximately 40 lubricants of both grease and fluid types, and general directions for proper application. Discusses lubricant requirements of equipment in 25 major industries. Lubriplate Div., Fiske Brothers Refining Co.

237 **The Why, What and How of Lubricants** — This 20-pp booklet explains and illustrates common tests and terms describing lubricants. Covers viscosity, flash and fire, neutralization, number, penetration, specific gravity, extreme pressure, steam emulsion, corrosion. Tide Water Associated Oil Co.

238 **Lubrication of Refrigeration, Air Conditioning Equipment**—Revised Technical Bulletin B-3 is a 56-pp illustrated manual filled with practical tips on good lubrication practice for both large systems and small units. Discusses types of refrigerating systems, functions of essential parts, characteristics of refrigerants, effect of refrigeration on oils, lubrication recommendations and the applications of refrigeration. Covers selection of oil and gives instruction on lubrication of compressors, bearings, air conditioning equipment. Sun Oil Co.

239 **Cooperative Technical Consultation Service**—This 24-pp booklet presents company's periodic consultation service offered to industrial plants and aimed at efficient use of petroleum products. Covers services available in solution of lubrication problems, metalworking operations, processing, fuel and heating oils, dust control. Gulf Oil Corp., Gulf Refining Co.

240 **More Work per Drop of Oil**—Illustrated Form 425 introduces company's Micro-Fog, an improved lubricator designed to offer more thorough lubrication, reduced maintenance. C. A. Norgren Co.

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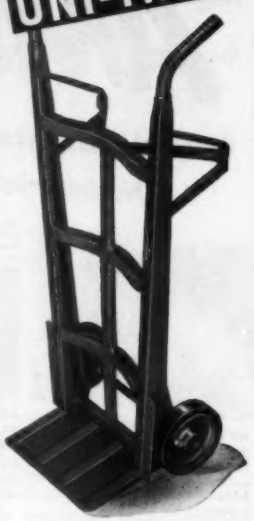
HALLOWELL

UNI-TRUK



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Tough jobs are easy with these sturdy, 2-wheel HALLOWELL Trucks. All-welded, all-steel construction minimizes weight (heavier model #738 weighs only 50 lbs.), cuts maintenance costs, lengthens truck life. Ribbed, angle-form steel nose carries heavier pay loads without bending, reinforces "UNI-TRUK" at point of severest stress. Two popular models: #738 with 8" wheels and braced legs; #734 with 6" wheels, no legs.

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STANDARD PRESSED STEEL CO.

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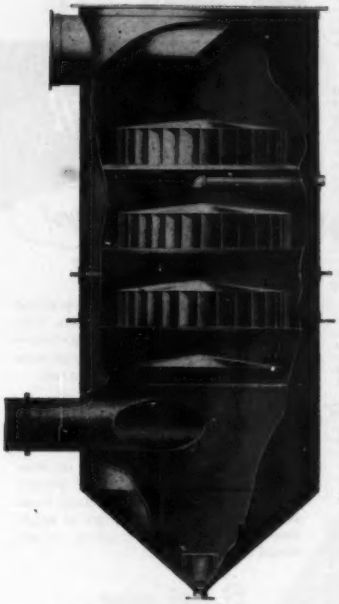
Harmful Plating and Pickling Vapors Vanish with

MULTI-WASH



MULTI-WASH COLLECTORS

Two models are available: the HC with capacities from 1500 to 36,000 c.f.m. or multiple units for larger capacities.

The JC—from 1000 to 36,000 c.f.m. capacity or in multiple units.

Harmful plating and pickling vapors can become a costly, unnecessary nuisance. If the fumes and odors are not properly controlled, serious employee and public relation problems can arise.

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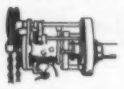
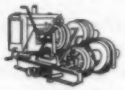


SOOT BLOWERS
high temperature

BUCKETS
exposure to weather



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corrosion, dust

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NATURAL GRAPHITE

D

INSTRUMENTS, CONTROLS

241 Data on Spring Scales—This catalog offers 40 pp of application and ordering data on spring scales and test apparatus. Covers dynamometer scales, push-pull gages, straight-spring scales, platform scales, and conveyor scales, also compression and tension testers, tensiometer, torque tester and consistometer. Illustrated, explains operation of the various instruments. John Chatillon & Sons.

242 Industrial Control Devices—Catalog 8303, 64 pp, presents 100 models of non-indicating electric, electronic, and pneumatic controllers for flow, pressure liquid level and humidity applications. New instruments shown include electronic temperature controllers. Brown Instruments Div., Minneapolis-Honeywell Regulator Co.

243 Handbook on Automatic Controls—Catalog 700 provides 45 pp of ordering and application data on automatic controls with mercury contact switches. Covers control equipment for temperature, pressure-low water, liquid level, boilers; transformer-relays, control valves, mercury switches. The Mercoid Corp.

244 Electrical Instruments—A line of instruments for production testing, plant maintenance and service is shown in 16-pp Bulletin A-16-B. Among these are a-c clamp volt ammeters and a-c clamp ammeters, circuit testers, analyzers, mutual conductance tubechecker, pocket-size meters, matched a-c and d-c portable instruments, also current transformers, light meters. Weston Electrical Instrument Corp.

245 Time Saving Volt-Ammeter—Manual 110, 16 pp, "How to Make Your Job Easier with the Amprobe," describes the handiness of this pocket-size volt-ammeter in installing, repairing, servicing electrical equipment. Pyramid Instrument Corp.

246 Air Locks—Bulletin S-31, 2 pp, describing air locks and trip master controls for holding regulating and control valves in position during failure of air supply, is illustrated with photos, diagrams, line drawings. The Swartwout Co.

247 Wide Range Regulator—Featured in Bulletin 316 is an expansion stem type temperature regulator operated by water or compressed air. Explains how regulator works, how it is easily changed from direct-acting to reverse-acting instrument. The Powers Regulator Co.

VENTILATING, AIR CONDITIONING, DUST CONTROL

248 Dust Collectors — Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes capacities, sizes. The Kirk and Blum Mfg. Co.

249 Dust Control—Bulletin 98 explains value of industrial dust control and principles of dust suppression, collection by filtration. Describes dust control equipment, providing specifications, dimensions on filters, systems, automatic controls. The W. W. Sly Mfg. Co.

250 Improved Air Conditioning—Advantages and applications of a controlled humidity method of air conditioning are discussed in Bulletin 112. Process is explained, illustrated. Niagara Blower Co.

251 Vacuum of Many Jobs — Bulletin 144, 20 pp, describes and illustrates 132 unusual industrial jobs for company's vacuum system. The Spencer Turbine Co.

252 Dust Precipitators—Twelve-pp Bulletin 1728 covers manufacturer's latest design of dust precipitators, a line designed to handle fly ash, cinders and industrial dusts, to meet the need for a compact, simple, economical all-purpose mechanical type unit. Includes performance and efficiency curves. American Blower Corp.

253 Dust Recovery — "Engineered Efficiency in Dust Collection and Recovery,"

Set Studs into Steel or Concrete in seconds

with the

VELOCITY-POWER DRIVER

Better 3 Ways!

1. IT'S SIMPLE

One-handed operation. Load—position—fire. Stud imbedded—job done. Two basic parts—barrel and firing unit—easy to service. Integral cartridge bans matching and fitting—ready to use.

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Drives studs easily into steel or concrete. Interchangeable barrels permit driving of either ¼ or ⅜-in. studs from same firing unit. Wide range of studs available—solid head, internal or external threaded types.

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Center-fire cartridges plus spring-loaded safety arm that must be rotated 180 degrees and held before stud can be fired makes accidental discharge impossible. Barrel design and long bearing area of piston avoids ricochet, flash, recoil. Cartridge assemblies assure right load for the job. Write for Bulletin No. TA-17.

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An amazingly efficient portable pedestal press, which combines with the Power-Twin Hydraulic Ram to perform hundreds of tough jobs easily and quickly.

STRONG. Handles 95% of all pulling or installing jobs. Especially designed for use with OTC 17½ ton Hydraulic Puller.
AMAZINGLY PRACTICAL for all production, assembly line and maintenance operations.
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COMPACT. Base is only 20 x 21 inches.
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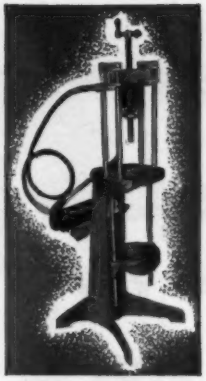

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Bench frame available for use with OTC Power-Twin Center-Hole Hydraulic Ram. Provides compact, inexpensive hydraulic press for mounting on bench for use in shop—or service truck for use on the job.

See your jobber for complete information or write us.

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36 pp, discusses industrial dust recovery from standpoints of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size distribution and specific gravity of dust on efficiency. Buell Engineering Co., Inc.

254 Dust Control Technology — Detailed selection, operation and maintenance data are contained in this 50-pp digest-size book, "Industrial Dust Control Through Exhaust Systems." Treats exhaust hoods, piping systems, dust collecting equipment, exhausters and drives. Lists basic methods of dust control and analyzes elements of exhaust systems. Discusses control of air movements, recommended hood and enclosure design, exhaust air velocity and volume and rules for installing system piping. Pangborn Corp.

255 Weatherproof Power Exhausters — Featured in this 8-pp bulletin are direct-drive exhausters so designed that the motor is out of the line of air flow to avoid damage by moisture and corrosive fumes. Includes recommended average air changes, air velocities required for exhaust hoods, rating table. The Gallaher Co.

256 How Conditioning Units Can Help—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling, hot water, steam heating. Clarage Fan Co.

257 Replaceable Air Filter—Introducing the Amer-glas filter, which comes in standard sizes for forced heating, ventilating and air conditioning systems. Bulletin 211 explains its operating principle, discusses its resiliency, efficiency and maintenance. American Air Filter Co., Inc.

258 Tubular Dust Filters — Advantages, uses and design of tubular dust filters are given in Bulletin 24-D. Presents both single compartment and automatic continuous multi-compartment units. Describes bag shaker mechanism, dust discharge valve, dust hoppers. Ruemelin Mfg. Co.

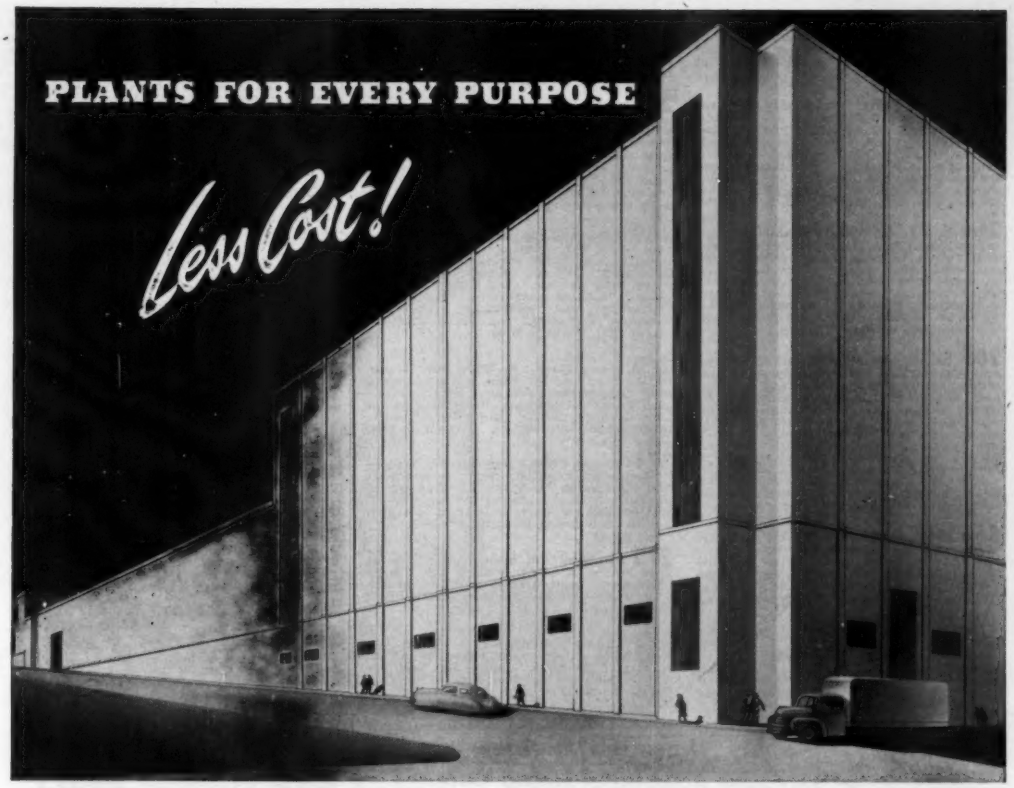
259 Heavy Duty Ventilation Filters — Form DPF-100.LH presents a dry panel filter with a filtering area of 23 sq ft. Tells features, uses; includes installation data, filter selection chart. Dollinger Corp.

HEATING

260 Heating Controls — Form F-1743-2 is a 36-pp catalog on controls for heating and air conditioning. Covers thermostats, motor operated and solenoid valves, control motors, linkage and dampers, control systems and packaged units, program switches. Barber-Colman Co.

261 Plumbing and Heating Supplies—Edition F is a 118-pp catalog listing over 2500 repair parts and precision tools for maintenance of all types of plumbing fixtures. Fully illustrated, includes plumbing fixtures. J. A. Sexauer Mfg. Co., Inc.

262 Unit Heater Selection — Sixty-pp Bulletin DS-327B tells how to choose propeller-type unit heaters, where to locate them and how to install them. Shows how



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manufacturer's heaters are constructed. Covers heaters for ventilation with duct work, piping details, controls, maintenance tips, steam and hot water capacities. The Trane Co.

263 Heat-Transfer Equipment—An excellent source of information on shell and tube heat transfer equipment, 28-pp Catalog DM-1150 covers heat exchangers, tank suction heaters, oil preheaters, condensers, evaporators, after-coolers, gas coolers, centrifugal pumps and water heaters. Instructions for installation, operation and maintenance are included. Bell & Gossett Co.

264 How to Save Waste Heat—The utilization of unit heaters for recovery and distribution of waste heat from engine and compressor jacket water is covered in 4-pp Form 00531A. Method of using waste heat to lower space heating costs is explained. Several installations are detailed to illustrate piping hookups, control methods. Modine Mfg. Co.

265 Heating Equipment and Systems—Sixty-pp Catalog G-99 presents up-to-date ordering information on company's heaters and hot water heating specialties, also design tables and engineering data for venturi systems, two-pipe reverse return systems, panel heating systems, snow melting systems. Contains a parts list and section on servicing of circulators, valves, flow checks. Includes a check chart providing basic remedies for common hot water heating and indirect water heater complaints. Taco Heaters, Inc.

266 Fans, Unit Heaters—Ordering and engineering data on direct-connected centrifugal fans, self-cooled motor propeller fans, self-cooled motor unit heaters, and light-duty electric ventilators given in Bulletin S-309. ILG Electric Ventilating Co.

PIPING, VALVES, TRAPS AND FITTINGS

267 Design Properties of Pipe—This 12-pp booklet consists of tables listing pipe sizes and wall thicknesses currently established as standard, plus what is believed to be the most nearly complete tabulation ever published of dimensional properties of commercial steel pipe. Tube Turns, Inc.

268 Piping Pointers—This is company's popular piping manual covering fundamentals of sound piping practices. Discusses various types of valve designs and how each should be used. Pictures and names more than 80 kinds of fittings and contains many illustrated how-to-do-it features. Included with the manual is an 8-pp valve selection guide. Crane Co.

269 Valve Maintenance Guide — "Prevent Valve Failure Before It Starts," is a 28-pp text on valve selection, installation, inspection. Pictures damaged valves, explains how damage could have been prevented. Discusses maintenance schedules, inspection jobs, lubrication, pipe line checking, threading, regrinding, disc replacement. Jenkins Bros.

270 Steam Hook-ups—This 64-pp manual on hook-ups for steam traps, air vents and temperature controls provides diagrams, size calculations, selection data on traps and regulators, properties of saturated steam, dimensions. Sarco Co., Inc.

271 How to Choose and Use Air Traps—Bulletin 202 describes air trap selection and installation for automatic drainage of moisture from compressed air intercoolers, aftercoolers, receivers, separators and drip points. Armstrong Machine Works.

272 Strainers and Separators — Bulletin R-46-50A is a 16-pp catalog on T-type strainers, suction strainers, multi-flow and receiver separators. Contains dimensions, prices. American District Steam Co.

273 Unions and Fittings — Twelve-pp Catalog 50 covers manufacturer's line of unions of all types, elbows, tees and fittings. Describes special construction features. E. M. Dart Mfg. Co.

274 Safety Head Catalog—Section 10, Part 1 of Catalog 54, 32 pp, contains charts and tables covering almost any phase of safety head information. Tells where safety heads can be used and how to use them. Gives advantages of manufacturer's line in protecting pressure equipment. Tells how to choose safety head assemblies and rupture discs. Includes tips on lowering temperature at point of safety head location. Black, Sivalls & Bryson, Inc.

275 Solving Steam Trap Problems—This popular 36-pp catalog on steam traps contains specifications and capacities on steam traps, float traps, air release valves and pipe line strainers. Tells how to calculate condensation loads and select traps for all classes of equipment, including unit heaters, jacketed kettles, autoclaves, submerged surfaces, steam mains and header drips. Gives pointers on how to install traps and service them. The V. D. Anderson Co.

276 Handbook on Fittings, Flanges — Catalog wf-1950, 68 pp offers working in-

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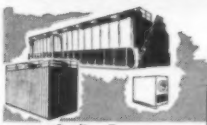

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formation on seamless carbon steel welding fittings and forged steel flanges. Includes dimensional tolerances, thread standards and threading practice; service pressure ratings, physical and chemical requirements. Grinnell Co., Inc.

277 Steam Trap Reference Manual—A lot of application and selection information on steam traps is packed into 24-pp Bulletin T-1740. Tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure traps sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Also provided are installation and operating tips, prices. Yarnall-Waring Co.

278 To Stop Those Leaks—Catalog 41-0 offers 28 pp of helpful ordering and application data on pipe repair clamps and saddles, valve and bibb resealers. Illustrates each product, tells where to use it and how to install it, giving dimensions and prices. M. B. Skinner Co.

279 Steam, Air and Gasoline Traps—Catalog 751, 32 pp, is a recently issued trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressures to 1500 lb; piston-operated steam traps, also separators. W. H. Nicholson & Co.

280 Reducing Valve Engineering Data—Bulletin 982 explains how the contour of a pressure reducing valve contributes to efficiency of performance. Discusses straight-line flow, tight closing. A. W. Cash Co.

281 Forged Steel Valves—Form 800-A illustrates and describes 600-lb forged, steel valves for high line pressure and temperature applications, giving dimensions, prices. The Ohio Injector Co.

282 Pipe Couplings, Joints—Composite Catalog 50 illustrates more than 500 ball-bearing swivel joints for temperatures from -25 F to 600 F and pressures from vacuum to 15,000 psi in sizes from ⅜ to 12 in. Chiksan Co.

WATER CONDITIONING

283 Hydrogen Zeolite Softeners—Publication 4530, 16 pp, presents hydrogen zeolite (cation exchange) water softening equipment. Gives a complete description of the process and the field of application, showing advantage of hydrogen zeolite softening and its relation to older sodium zeolite softening process. Cochrane Corp.

285 For Conductometric Determination of Solids—A quick and simple method for determining solids content of boiler water or condensate is explained and illustrated in Bulletin 2RE50. Hall Laboratories, Inc.

REFRACTORIES

286 Which Refractory?—Form 5120 is a 12-pp illustrated booklet explaining characteristics of several high quality refractories and telling what each is best suited for. Not an ordering book, covers silicon carbide types, electric furnace mullites, electrically fused alumina refractories and fused cast refractories, discussing them from standpoint of heat resistance, heat conductivity, chemical inertness, resistance to abrasion, spalling and thermal shock. The Carborundum Co.

287 Insulating Fire Brick—This bulletin presents economic advantages, industrial applications and refractory properties of an insulating fire brick for sustained use at 3000 F. Physical and thermal characteristics are given. Johns-Manville.

ELECTRICAL

288 Motor Control—A handy reference book on modern motor controls, comprises

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289 Motor Handbook—Bulletin MU-185 provides 66 pp of engineering and descriptive data on motors, covering splash-proof and explosion-proof types, gear motors, motors for use in chemical plants, for oil well pumping, punch presses, elevators, cranes and hoists. Wagner Electric Corp.

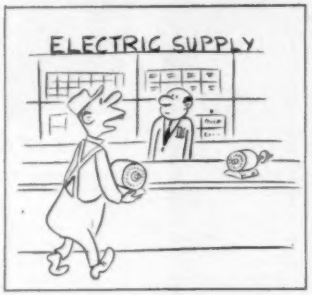
290 Power Distribution Feeders—Catalog TEB-1, 40 pp, on heavy-duty units for main feeders in distribution system, gives construction, engineering, application data. The Trumbull Electric Mfg. Co.

291 Precision Switches—Twenty-pp Catalog 51 covers industrial switches for a-c circuits. Describes general purpose basic switches, auxiliary actuators, enclosed, explosion-proof and splash-proof types, limit switches, small switches. Includes technical technical data, prices. Micro Switch.

292 Electric Motor Lubrication Studies—Bulletin 1579 shows comparative amounts of lubricant in different designs of bearings, how bearings are subject to air circulation. Explains company's Lubriflush principle. U. S. Electrical Motors, Inc.

293 Small Bus Duct—Detailed information on a midget-size bus duct is contained in Bulletin 703. Illustrates entire unit, also strap and hanger. Text discusses major parts, design features. Includes list prices. Frank Adam Electric Co.

294 Bus Duct Manual—Booklet B-4272A, 68 pp, on bus duct and accessories, presents application and test data, specifications, information on pricing a typical installation. Describes advantages of bus duct for a secondary power distribution system, carrying current from transformers to switchgear—and from there to motors, lighting systems, etc. Tells where bus duct can be used to advantage. Company's line of bus duct is shown and dimensions given. Also presented are overload protective units. A technical section gives tables and formulas useful in applying bus duct correctly. Westinghouse Electric Corp.



"It won't run. I think you forgot to fill it with electricity."

295 Distribution Duct Engineering Data—Bulletin 427-4 contains 32 pp of data for estimating ventilated duct for feeder circuits, plug-in duct, and plug-in duct for branch circuits. Includes instructions for laying out distribution duct jobs, and pointers on estimating, diagrams, layout symbols. BullDog Electric Products Co.

296 Plug-In Power — Sixty-pp Catalog 25 offers real help on electrical installation problems involving portable tools, materials handling equipment, cranes, hoists, cutting equipment. Covers a prefabricated trolley busway electrical distribution system to provide outlets for power or light where needed. Feedrail Corp.

297 Buyers' Manual on Motors and Control—Fifty-pp Catalog GEC-1009 presents buying information on a carefully selected group of motors, motor starters, control accessories and electronic control. Ratings listed are those most frequently required. Excellent selection data, dimensions, ratings and prices. General Electric Co.

298 Weatherized Motors—Six-pp Bulletin 400 describes company's All-Weather integral motors for industrial use. These have full height protection, through ventilation, one-piece steel shell, interchangeability of end head. Robbins & Myers, Inc.

299 Circuit Breaker Reference Data—Catalog Section 5000 is a collection of more than 30 data sheets providing selection and application information and ordering instructions for company's molded case circuit breakers. Fully illustrated, includes ratings, current carrying capacities, dimensions, prices. I-T-E Circuit Breaker Co.

300 Power and Control Cables—Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Gives standard reel sizes and capacities, standard specifications. Rome Cable Corp.

301 Retractile Cords—Bulletin KKG describes and pictures some of the applications for permanently coiled, neoprene jacketed electric cords which expand to 5 times retracted length. Koiled Kords, Inc.

302 Battery Technology Handbook—This is a 56-pp revised edition of company's manual of technical instruction and engineering data on the care of motive power storage batteries. Major addition is a section on charging, which includes information on modified constant voltage and two-rate charging, boost, equalizing and emerging charging, control of discharge, etc. Other sections cover the theory of the lead-acid battery; practical tips on care and operation; maintenance and repair; technical data. Fully illustrated, also catalogs battery parts, tells how to order them. Gould-National Batteries, Inc.

303 Thermal Fuses—Folder 482-ST on company's Saf-T-Lag thermal fuses explains what these triple-action fuses are designed to do and how they operate. Jefferson Electric Co.

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LIGHTING, COMMUNICATION

304 Industrial Lighting at Work—Sixteen pp Booklet B-4727 stresses three ways of putting better lighting to work: cutting costs by promoting more production; increasing efficiency by ensuring accuracy, and reducing accidents by exposing dangerous operations. Analyzes mercury vapor and incandescent light sources as to efficiency, service life, maintenance, mounting height and job suitability. Luminaires of each type are pictured; wattage and lumen output ratings. Westinghouse Electric Co.

305 Recommended Lighting Systems — This 16-pp article describes six lighting systems adaptable to most industrial plants. They include systems for illumination levels of 20 to 40 ft-c, for levels of 40 to 60 ft-c and for levels of 60 to 100 ft-c, and involve use of filament, fluorescent, and mercury lighting and combinations of these. Explains lighting classifications, and discusses advantages of each type of lighting. Also discusses supplementary lighting. Lamp Dept., General Electric Co.

306 Plant Lighting Planning Guide—This 32-pp handbook of industrial lighting presents economics of a plant lighting program in terms of lower production costs, reduced working time, less fatigue and eyestrain, less spoilage, fewer accidents, better morale. Explains six major steps in initiating, developing and carrying out a lighting program; tells how to select equipment and stresses importance of maintenance. Includes table of recommended levels of illumination for industrial interiors. Benjamin Electric Co.

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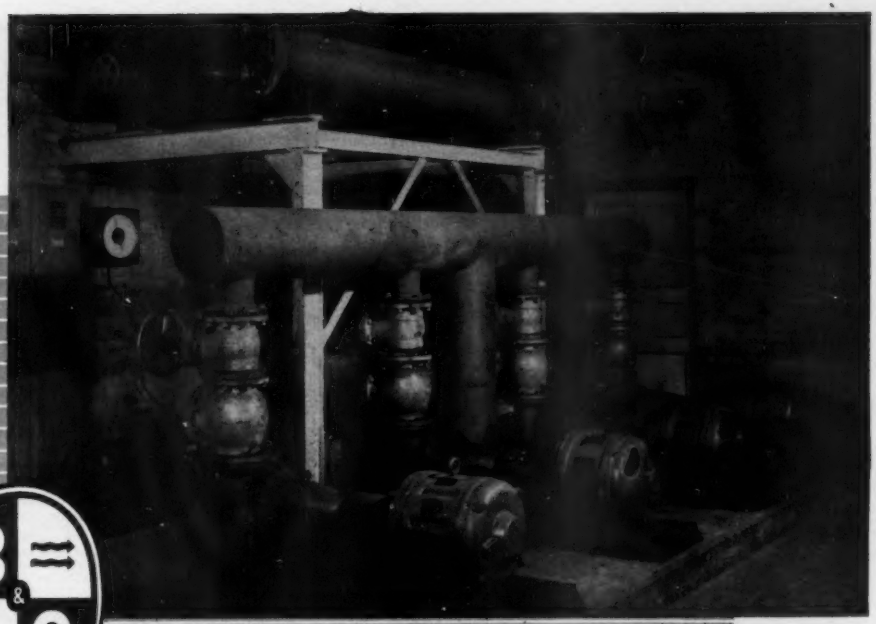

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307 Selection Data on Lighting Fixture Hangers—Catalog 50, 80 pp contains general and detailed information on disconnecting and lowering lighting fixture hangers, accessories, special devices and parts. Utilizes 247 photos and drawings to show construction principles, operating features, installations, modifications and component parts for both indoor and outdoor units. The Thompson Electric Co.

308 Plant Communication Systems—This 25-pp brochure describes a high and low level intercom system readily installed and permitting two-way conversations over close-speaking microphones and receivers as well as paging over loudspeakers suited to different noise levels. Gai-Tronics Corp.

MECHANICAL POWER TRANSMISSION

309 Chain Drive Manual—Catalog SCE-50, 68 pp, on chain drives, cites advantages and recommends applications. Give information on chain length calculations, installation and maintenance, ratings, chain types, pitch and sprockets. Includes prices. Whitney Chain Co.

310 Manual on Power Transmission Machinery—Containing 225 pp of data, this illustrated handbook covers roller bearings, V-belt drives, friction clutches, couplings, collars, sleeve bearings, pulleys, take-ups and hangers. Provides engineering, selection, ordering information; includes formulas. Dodge Mfg. Corp.

311 Power Drive Handbook — Catalog 709, describing roller chains and sprockets, includes tips on selecting stock roller chains for every type of power drive service. Diamond Chain Co., Inc.

312 Handbook on Chains and Sprockets—An excellent reference book is 216-pp Catalog A418. Discusses various chains and their service applications, metals used in them, and factors affecting their efficiency. Gives selection information on chains for drives and for elevators and conveyors. Engineering data includes dimensions, strengths, weights. The Jeffrey Mfg. Co.

313 Manual on V-Belt Drives—Catalog 280 is pocket-sized, but contains 384 pp of illustrations, tables and other technical information to make it possible to select V-belts for any power transmission drive quickly and accurately. List prices, dimensions included, also a 12-pp supplement on cog belt drives. The Dayton Rubber Co.

"And I don't want to hear how you started this business either."

314 Blocks and Sheaves—Catalog 300-24 24 pp, covers manufacturer's complete line of blocks and sheaves. Provides block number, capacity in tons, number of sheaves, rope size and weight of each block. Illustrations, ratio table and formula included in a section on figuring line parts. American Hoist & Derrick Co.

315 Variable Speed Control — Twelve-pp Bulletin G-509, 12 pp, describes basic operating principle of company's variable speed drives and contains representative rating tables and dimension drawings. Covers capacities from ¼ to 87 hp with stepless speed changes within ratios from 2 to 1 to 16 to 1. Reeves Pulley Co.

316 Variable Speed Control Simplified—Bulletin 700 contains some 40 pp of descriptive, application and engineering data on variable speed pulleys and selective speed transmissions. Illustrations show how old and new machines can be equipped with efficient variable speed control. Lovejoy Flexible Coupling Co.

317 Brakes and Brake Motors—Construction advantages of company's brakes are featured in illustrated Bulletin SL-610-1 on brakes and brake motors. Dimensions, mechanical and electrical characteristics. Crocker-Wheeler Div., Elliott Co.

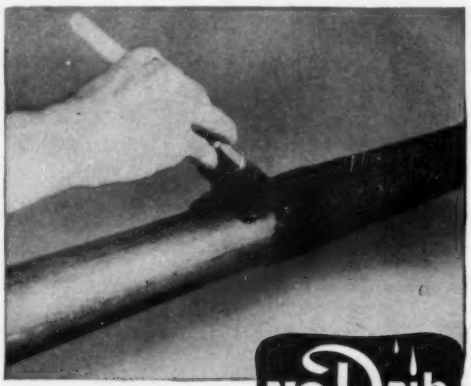
318 Longer Life for Bearings — Bulletin 57B describes an economical three-step metallizing process which provides hard, oil holding surfaces for new and worn bearings. Metallizing Engineering Co., Inc.

MATERIALS HANDLING

319 For Efficient Overhead Handling—Bulletin C-1, 56 pp, pictures overhead equipment for practically all industries. Stresses construction, safety, electrical advantages of trolleys, cranes, track and auxiliaries. The American MonoRail Co.

320 Handling Equipment Ordering Book—Ninety-pp Catalog 23 describes power trucks, power jacks, stackers, cranes, hand trucks, platforms, storage racks. Fully illustrated. Lewis-Shepard Products, Inc.

321 Manual on Electric Hoists — Catalog H-46, 44 pp, covers monorail and sta-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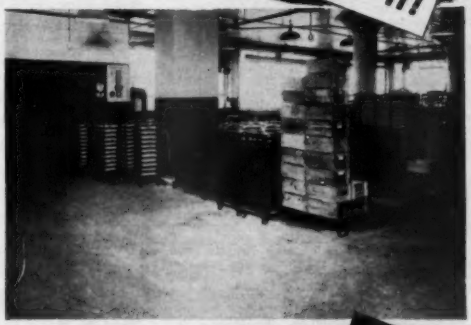

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tionary hoists and car pullers. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls; gives dimensions. American Engineering Co.

322 Handbook on Overhead Conveying Systems—Manual A-56 provides 200 pp of information on overhead track systems and conveying equipment. Pictures installations, construction details; gives engineering and application data. Richards-Wilcox Mfg. Co.

323 Portable Hoists — This bulletin describes a lightweight air hoist in 2000, 1000, 500 and 300-lb capacities. Gives specifications, dimensions, operating advantages. Keller Tool Co.

324 Fastenings for Conveyor Belts — This collection of data covers hinged fastenings, repair plates, lacings, hooks, round belt couplings, also lacers, cutters. Gives instructions for use. Armstrong-Bray & Co.

325 Safe Truck Operation — "Safety Saves!" is a cleverly written 24-pp booklet setting forth "do's" and "don't's" established as a practical code of truck operation. The admonitions, presented in good-humored fashion, and pointed up by cartoons, are offered as both "refresher course" and fundamental text. Industrial Truck Div., Clark Equipment Co.

326 Data on Tramrail Equipment — Twelve-pp Form 2008F is a recently revised booklet on tramrail systems. Tells what an installation can do toward improving handling efficiency. Rail and arch design, switches, cranes and transfer bridges, carries, hoists, cranes, buckets, grabs are pictured. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

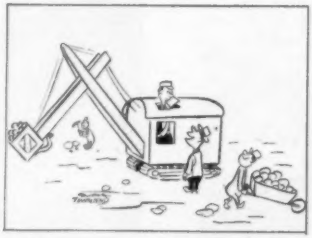
327 Conveying Systems Manual — Unloading and conveying of dry pulverized material are discussed in 24-pp Bulletin FK-25. Text covers system and operation; stationary pump, accessories. Fuller Co.

328 Electric Lifters—Medium and heavy-duty electric lifters are described and illustrated in Bulletin LU50. Company's ball bearing hoisting unit is discussed. Economy Engineering Co.

329 Conveyor and Elevator Belts—This 26-pp collection of catalog sections illustrates parts used in construction of company's conveyor and elevator belts. Discusses increased service life and decreased maintenance. The B. F. Goodrich Co.

330 Industrial Logistics—Form A-9516-4450 is a 12-pp booklet covering strategic handling of materials from raw state to distribution. Discusses master unit load and transportation cycle. Explains company's system of adapting all loads to four types of containers, assembling maximum numbers of these into master unit loads, and transporting them as single units. Tells how to apply system, cites examples of use. The Elwell-Parker Electric Co.

332 Drawbar Pull Tractor — Manufacturer's newest Shop Mule, a 12,000 lb. drawbar pull tractor with torque converter



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is presented in illustrated Bulletin 1545. Gives operating data. The Buda Co.

333 All-Around Bulk Handler — Catalog Supplement 8065, 16 pp, describes the Dumpster, a truck-mounted carrying and dumping unit which does the work of several trucks by means of interchangeable containers. Shows how different containers handle a wide range of bulk materials, solids, liquids. Dempster Bros.

334 Materials Handling Equipment — Illustrated Catalog P602 is a 44-pp guidebook on materials handling equipment for industrial plants. Subjects covered include description and application data on company's gas and electric fork lift trucks, motorized hand trucks, hand lift trucks and hand and electric hoists. Describes attachments available to give trucks versatility. Yale & Towne Mfg. Co.

335 Metal Conveyor Belts — This 24-pp booklet is an illustrated guide to selection of metal conveyor belts. Presents both conventional and balanced spiral weave belt; covers raised edge and flight constructions, chain edge constructions, high temperature belts, wire conveyor aprons. Includes photos, data on weaving limits, weight, mesh openings, take up for wire conveyor belts. Wickwire Spencer Steel Div., The Colorado Fuel and Iron Corp.

336 Feeders, Conveyors — An excellent presentation of electric vibrating feeders and conveyors is given in 90-pp Catalog 830 covering manufacturer's line of equipment for handling a wide variety of wet and dry materials and including large and small capacity units, for temperatures of -30 to 2000 F. Explains principles of design and operations, gives tips on installation, discusses controls. Includes photos, dimensions and specifications for models listed, table showing densities of solid materials. The Jeffrey Mfg. Co.

337 Trucks, Casters, Wheels — Catalog 50, 65 pp, covers platform trucks, super-

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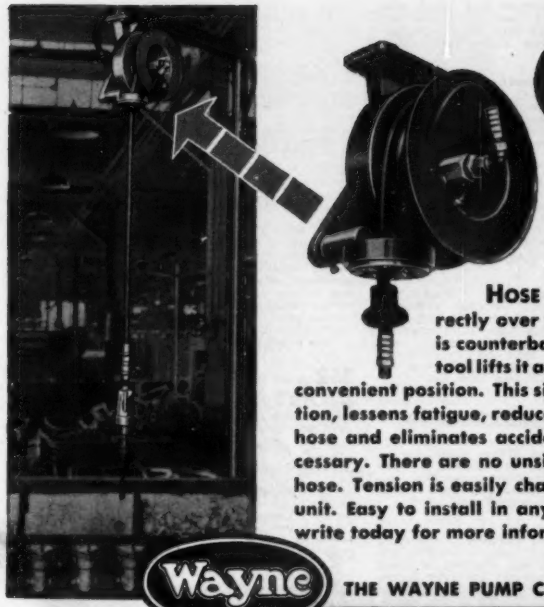

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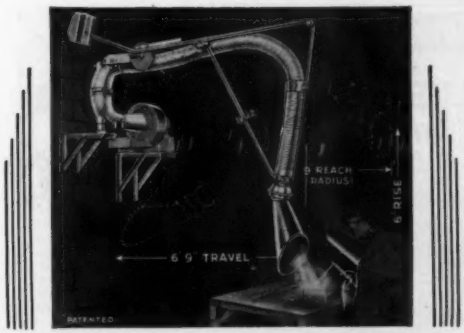

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338 Data on Truck Casters—As much specific information as can be presented in a catalog for commercial usage is included in 105-pp Catalog 124 on truck casters. Besides specifications, ordering data and photos, this well-indexed book includes load capacity charts, defines caster terminology, tells how to select casters and install them. The Bassick Co.

339 Hydraulic Jacks—Hand, wheeled and gage-equipped jacks from 1½-t capacity models to 100-t capacity extra-heavy duty jacks are covered in Catalog J-50, 16 pp. Illustrated, includes specifications, selection information. Explains construction features. Blackhawk Mfg. Co.

340 Sheet Lifters — Operational and design features of company's sheet lifting equipment which contribute toward efficient handling, flexibility and economy are explained in Bulletin S-25, 16 pp. Cullen-Friestedt Co.

341 How to Use Conveying Systems—Eight-pp Bulletin W-1049 shows how to effect operating and labor economies through use of conveying systems in production operations. Basic types of conveyors and where and how each can be used most efficiently are described and illustrated. Explains types of conveyors best suited to handling various products under typical conditions. Chief components of individual systems are discussed. Walter Maguire Co., Inc.

TOOLS

342 Pipe Tool Operating Guide — Form O.G. is a concise 4-pp folder prepared to help users get best results from portable pipe and bolt machines and hand pipe tools. Tells quickly how to locate and correct pipe machine and hand pipe tool troubles. Beaver Pipe Tools, Inc.

344 Pipe Tool Ordering Guide—Newly-published Catalog, 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs, and wrenches, giving dimensions, selection information. Includes price list. Armstrong Bros. Tool Co.

345 Powerful Puller—Introduced in Bulletin 97-A is the compact Power-Twin, a fast-working hydraulic ram. Shows how this ram, with its center hole feature, can convert all of company's pulling systems to hydraulic push, pull or lift operation. Owatonna Tool Co.

346 Pipe Bending Tools — Pocket-size Bulletin E-201, 16 pp, describes hydraulic and hand operated units for bending iron, steel and non-ferrous pipe, rigid conduit, tubing and bus bars. Illustrates each type of tool and tells its applications, sizes. Also describes a power pump for hydraulic units. Greenlee Tool Co.

ENGINES, GENERATORS

347 Re-Circulation Steam Generator — Here's a 6-pp folder introducing a controlled re-circulation steam generator, describing its development and uses. Combustion Engineering-Superheater, Inc.

348 Modern Steam Engines — Stressing value of "by-product" power, Bulletin 306 describes vertical steam engines of both throttling and automatic governor types. Troy Engine & Machine Co.

349 Steam Generators—A bulletin giving information needed for ordering packaged steam generators, this features a cutaway illustration and explanation of design features. Includes specifications and dimensions, test data. Superior Combustion Industries, Inc.

350 Turbine Generators—Bulletin H-18, 40 pp, covers turbine-generators of 500 kw and above, pictures nearly 50 turbine-generator installations, both utility and industrial. Brief discussions of generator and exciter cooling methods are included. A reference section offers detailed drawings showing a typical turbine condenser installation arrangement. Elliott Co.

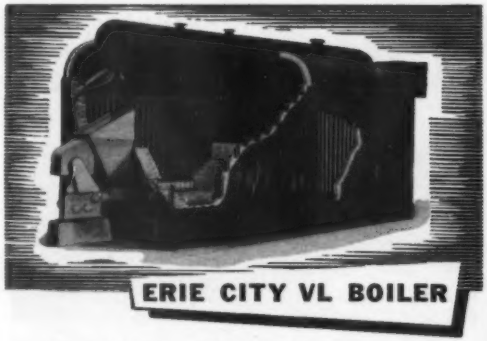
OTHER EQUIPMENT

351 Wire Cloth and Screen—This 48-pp handbook offers valuable help in selecting and ordering industrial wire cloth and woven wire screens. It's illustrated with photos showing wire sizes, spacing, weaves and crimps and types of openings. It discusses applications of different types, and metals used. Includes weights of copper, brass and iron wire per 1,000 ft. Korb-Pettit Wire Fabrics and Iron Works, Inc.

352 Steel Cabinet Benches—Construction features of steel benches are covered in 8-pp Bulletin 702. Six models are illustrated with dimensions and available top materials given. Standard Pressed Steel Co.

353 Elevated Steel Tanks—Welded steel tanks with ellipsoidal bottoms and roofs are presented in this 24-pp booklet as an economical means of increasing plant water storage capacity, maintaining uniform pressure, meeting peak loads and reducing pump costs. Capacity table included. Chicago Bridge & Iron Co.

354 For Tramp Iron Removal—Sixteen-pp Catalog 15 is a new and excellent source of material on non-electric permanent magnetic separators for tramp iron removal. Complete descriptions of separators, engineering and selection data provided. Eriez Mfg. Co.



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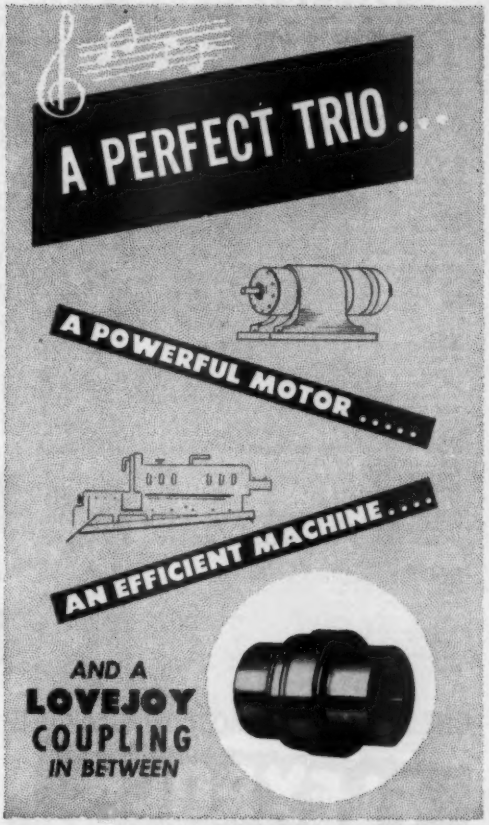

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357 Solder Text — This 36-pp book is basically an editorial treatise. Separate sections are devoted to thermal effects, mechanical properties, principles of soldering and fluxes. Selection of proper solder for the job is explained, and fusible alloys described. Practical suggestions and description of company's solders are provided, also technical data, including melting range of tin-lead solders, ASTM, SAE and other specifications. Federated Metals Div., American Smelting and Refining Co.

358 Steam Boilers—Form SG 128-749 is on steam boilers for processing and heating, ranging from 15 to 500 hp and 15 to 200 psi. Includes a diagrammatic cross-section showing the four-pass design characteristics of the boilers. Cleaver-Brooks Co.

359 For Spotting of Overhead Loads—Bulletin 921-A on magnetic crane controls for d-c cab-operated cranes lists standard features for crane-hoist service and bridge or trolley service. Explains time-current method of acceleration, operating principle of Wright dynamic lowering circuit controller. The Electric Controller & Mfg. Co.

360 Industrial Dry Coolers—Illustrated Bulletin DC-50, 12 pp, presents company's dry cooling equipment for small, "in-between," and heavy-duty cooling jobs and includes three recent models. Two are small "portable" units and the third a medium-size unit. Although designed primarily for cooling engine jacket water, they can be used for cooling natural gas, lube oils, fluids of refining stages. The Marley Co., Inc.

361 Time-Saving Templates—Catalog 50 is a concise 8-pp ordering guide picturing and describing more than 40 drafting templates covering a wide range of engineering symbols. Includes electrical, piping, processing, welding, instrument, gears, fasteners. Prices given. RapiDesign Inc.

362 Four Handy Guides for Plant Engineers—Bulletin 20B6051J, 12 pp, offers data on figuring V-belt drives; Bulletin 51B-6025K, 12 pp, for quick selection of electric motors; Bulletin 52B6059E, 16 pp, for selection of centrifugal pumps, and Bulletin 25B6051B, for power generation, distribution and control equipment. Specify booklets wanted. Allis-Chalmers Mfg. Co.

363 Vacuum Blasting — The efficiency and economy of vacuum blasting equipment for cleaning of equipment and other maintenance jobs, weld preparation, and conveying of granular material, is shown in this bulletin. Vacu-Blast Co., Inc.

364 Group Washing Equipment—Washfountains designed for modern group washing requirements for industrial plants and institutions are described and pictured in Bulletin D-766. Bradley Washfountain Co.

365 Dry Chemical Extinguishers — New quick-acting fire extinguishers of the dry chemical type in 20 and 30 lb sizes are covered in Form C-104. Shows how unit is designed. C-O-TWO Fire Equipment Co.

366 Neoprene Goes to Work — Eight-pp Bulletin A-18 discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Rubber Chemicals Div., E. I. du Pont de Nemours & Co.

367 Easier Machine Installation—Bulletin 415 describes low cost machine mountings that simplify machine installation, control vibration, reduce noise and absorb impact. Gives illustrated directions for installing pads. The MB Mfg. Co., Inc.

368 Blowers and Accessories—Engineering and dimensional information on low, medium and high capacity blowers is given in this recently-released 6-pp bulletin. Pictures some installations, also accessories. Blower-Stoker Div., Read Standard Corp.

369 Power Brushes—Bulletin C-269, describing company's new line of power brushes, contains photos showing their design and use. The Osborn Mfg. Co.

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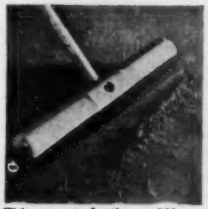

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'ROUND ABOUT

with the editors

(Continued from page 4)

manufacture and sale of industrial water cooling equipment. For further information regarding membership, kindly address your inquiry to Cooling Tower Institute, Basking Ridge, New Jersey.

News of New Plants

B. F. Goodrich Chemical Co., division of The B. F. Goodrich Co., is constructing a new plant in Calvert City, Kentucky. First material to be produced in this new plant will be vinyl chloride monomer. . . . A new aluminum smelting plant, the first to use lignite for fuel, will be built about 60 miles south of Waco, Texas, by **Aluminum Co. of America**. . . . Construction is under way on the expansion of two Philadelphia plants of **SKF Industries, Inc**. . . . The new plant of **Heli-Coil Corp.** at Danbury, Conn., is going full blast producing thread inserts. . . . Construction was started in August on America's first integrated mass production plant for guided missiles, a U. S. Navy facility to be operated at Pomona by **Consolidated Vultee Aircraft Corp.** . . . Construction of a new plant near Madison, Indiana, will increase output of headlight manufacturing facilities of **Westinghouse Electric Corp.** 50 per cent. . . . **Pittsburgh Coke and Chemical Co.** has completed the first major unit of its new central research laboratories at Neville Island near Pittsburgh, Pa. . . . **Kirk and Blum Mfg. Co.** has just completed an extensive modernization of its plant facilities at Cincinnati. Facilities of this one-floor brick structure include an exterior and interior rail siding and overhead crane handling system throughout.

Time and Motion Study Clinic

THE 15TH ANNUAL National Time and Motion Study Clinic, sponsored by the Industrial Management Society, will be held this year at the Sheraton Hotel, Chicago, Illinois, from October 31st through November 2nd. The clinic will cover various talks and papers on time and motion study, layout, incentives, humanics, and others. For registration information, kindly contact Industrial Management Society, 35 E. Wacker Drive, Chicago 1, Illinois.

Fire Prevention Week

IN KEEPING with the theme on page 89 we remind you that October 7-13 is Fire Prevention Week. The National Fire Prevention Association says that for every $100 of industrial plant expansion last year, $6 went up in smoke. There are 91 fires daily!

THE CAUSE: Carelessness.

THE CURE: Vigilance and good plant housekeeping. Always observe personal precautions: Take safety rules and "No Smoking" signs seriously; be sure your cigarette or match is out when you throw it away; take no chances with defective equipment; and, beware of static electricity.

Last year $175 million in industrial property was destroyed by fire. This loss does not take into account production and wages, medical costs, reduced savings and business failures directly related to the fires.

Info on Defense Contracts

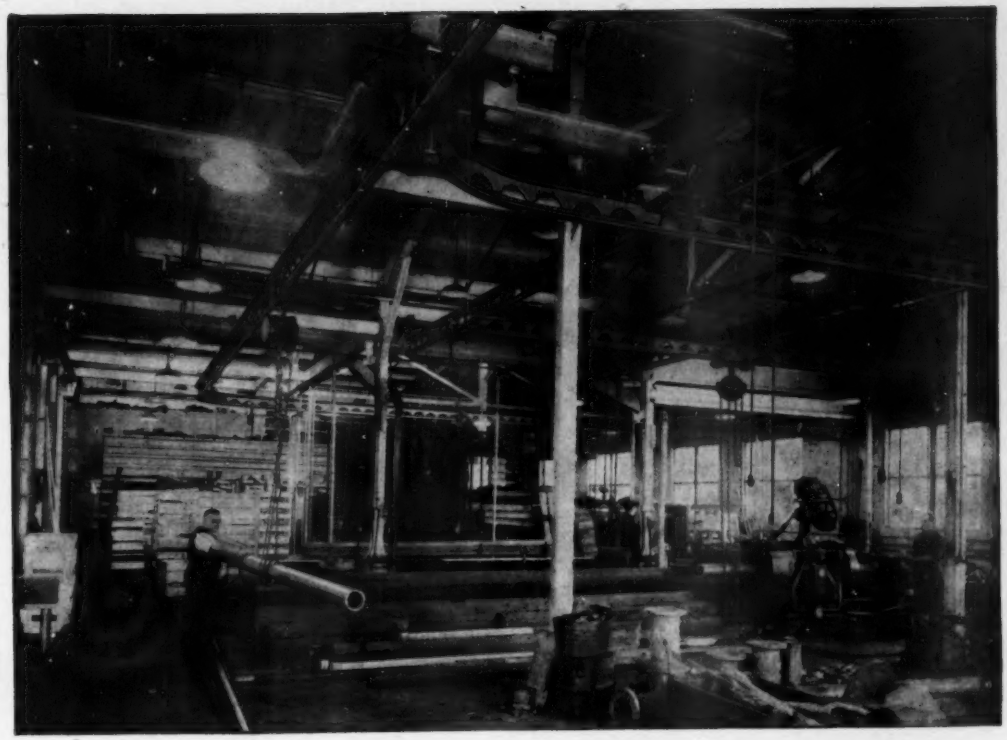
NATIONAL PRODUCTION Authority has issued a four-page pamphlet entitled "Converting to Military Production." It is specially designed to assist the small civilian producers threatened by materials shortages. It lists the steps and the considerations involved in securing government contracts. Copies are available through Printing Services, Department of Commerce, Washington 25, D. C.

Another booklet, issued by the Munitions Board's Office of Industrial Security, covers "How to be Cleared for Handling Classified Information Within Industry," an aid to businessmen seeking defense contracts. The booklet may be obtained, at 10 cents per copy, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Fall Meeting of Chicago Plant Engineers Club

THE FIRST FALL meeting of the Plant Engineers' Society of Chicago after the summer vacation was held on September 7th. TED RAMOND, president, was pleased to see several new faces among the 25 men that attended. DICK MORRIS, Editor of PLANT ENGINEERING, was unable to attend to give a report on his trip to England. After the general meeting TOM HANSON, Managing Editor, gave the report on Dick's trip, and showed slides and a film of the interesting English sights visited.

At the October 5th meeting, DON BROWN, Corn Products Refining Co., will discuss maintenance organization and incentive practices. Ted Ramond, of Goodman Manufacturing Co., will give a talk at the November meeting on roofs—types, construction and care. Plant engineers in and around Chicago, wishing further information about this club, should contact Don Brown, Corn Products Refining Co., 63rd and Archer Rd., Argo, Illinois.



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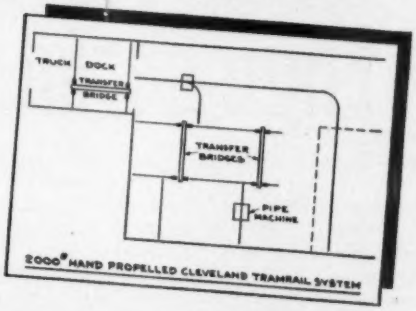
The Tramrail equipment makes it easy to place pipe in the threading and cut-off machines and support it while being worked on in these machines.

The overhead system which has a capacity of 2000 lbs. handles the pipe in a fraction of the man-hours that would otherwise be required. It requires practically no maintenance and is an important aid to safety.



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Oil	800	700	700	800	700	700

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